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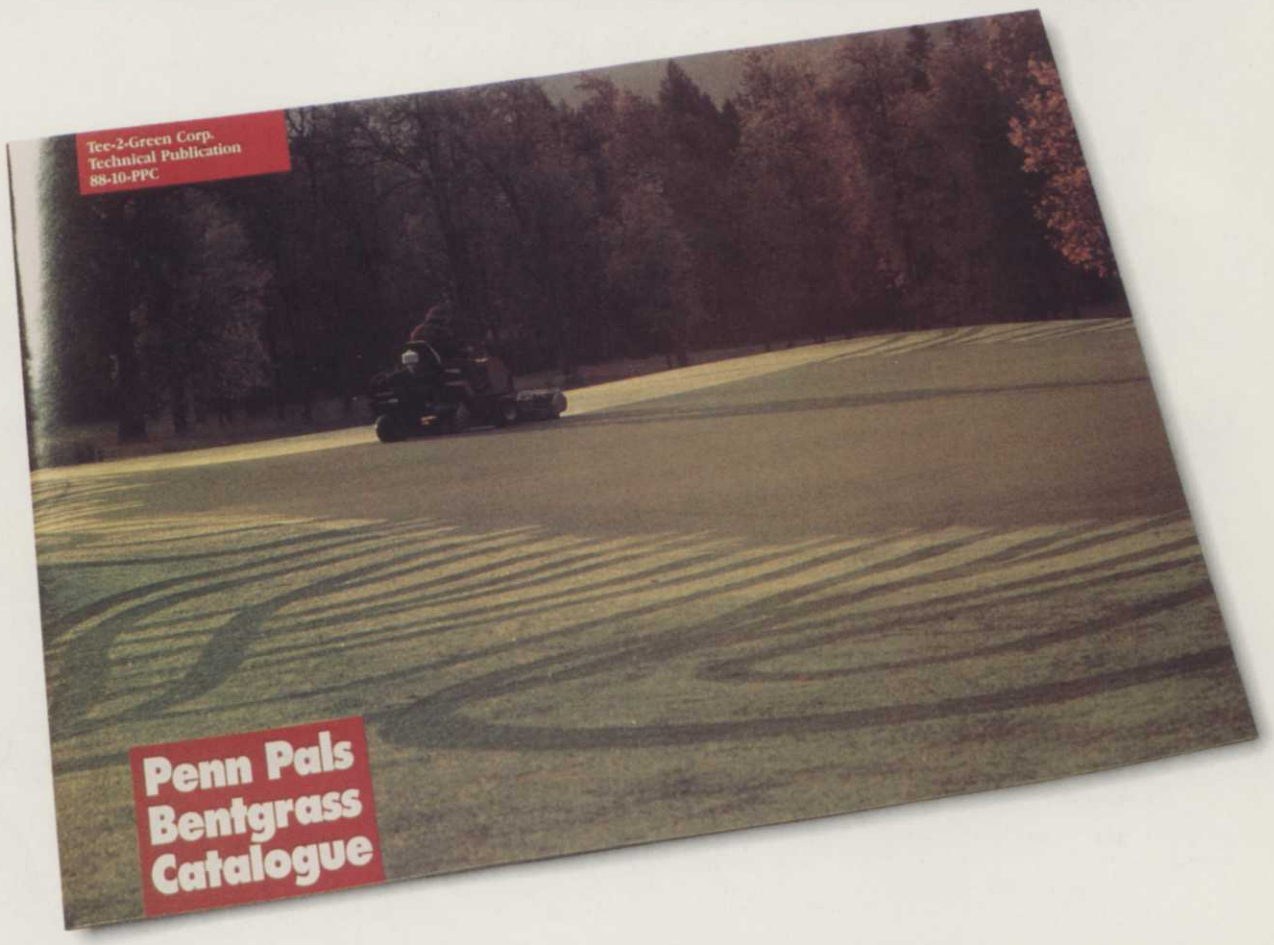

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MARCH 1989, VOLUME 29, NUMBER 3

LANDSCAPE MANAGEMENT

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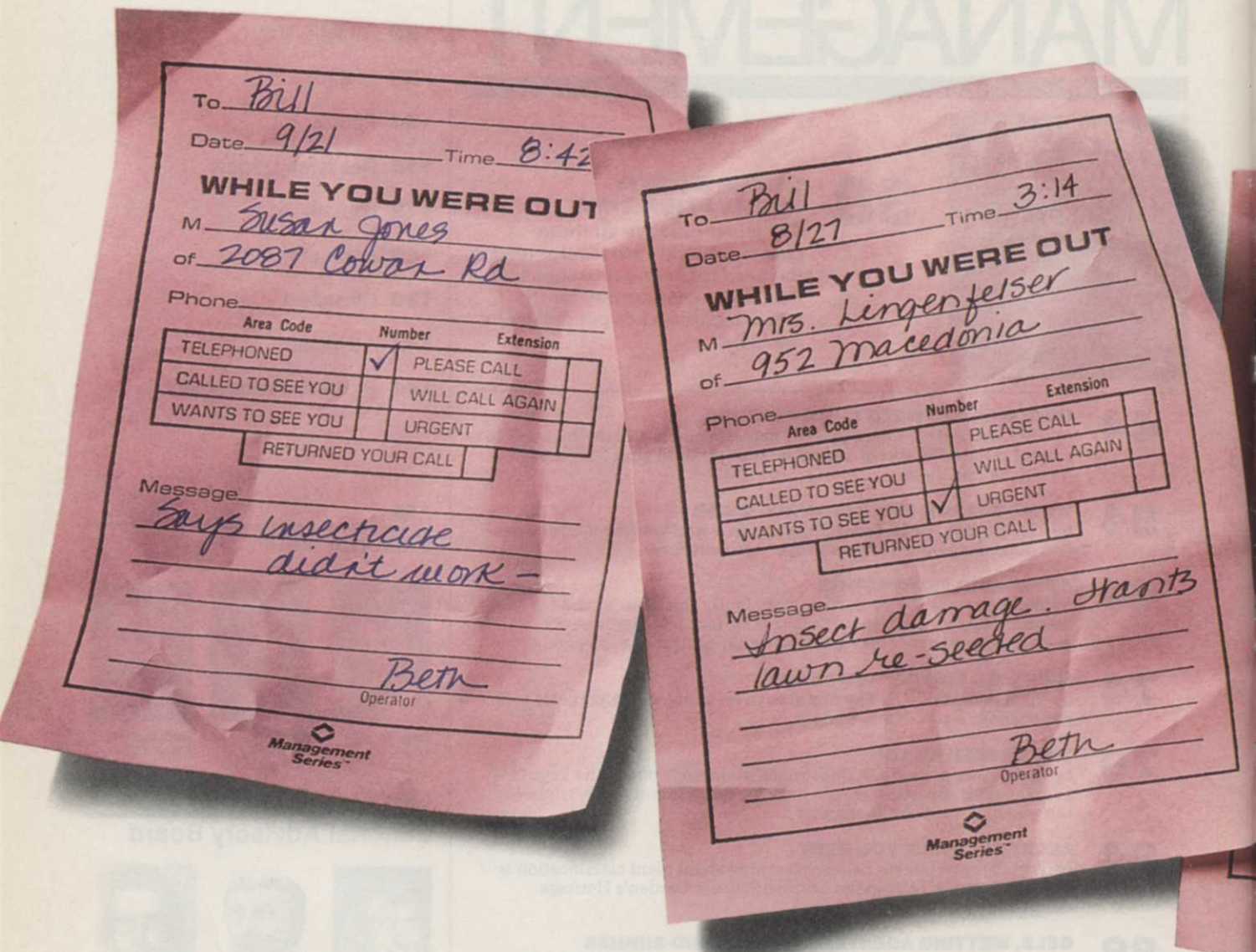

Triumph gets rid of the toughe

Constant callbacks and retreatments can drive even the best lawn care business right into the ground.

But you can reduce your callbacks —and increase your profits— simply by replacing whatever insecticide you've been using with Triumph®.

Because no other insecticide is proven more effective at controlling problem turf pests, including white grubs and mole crickets.

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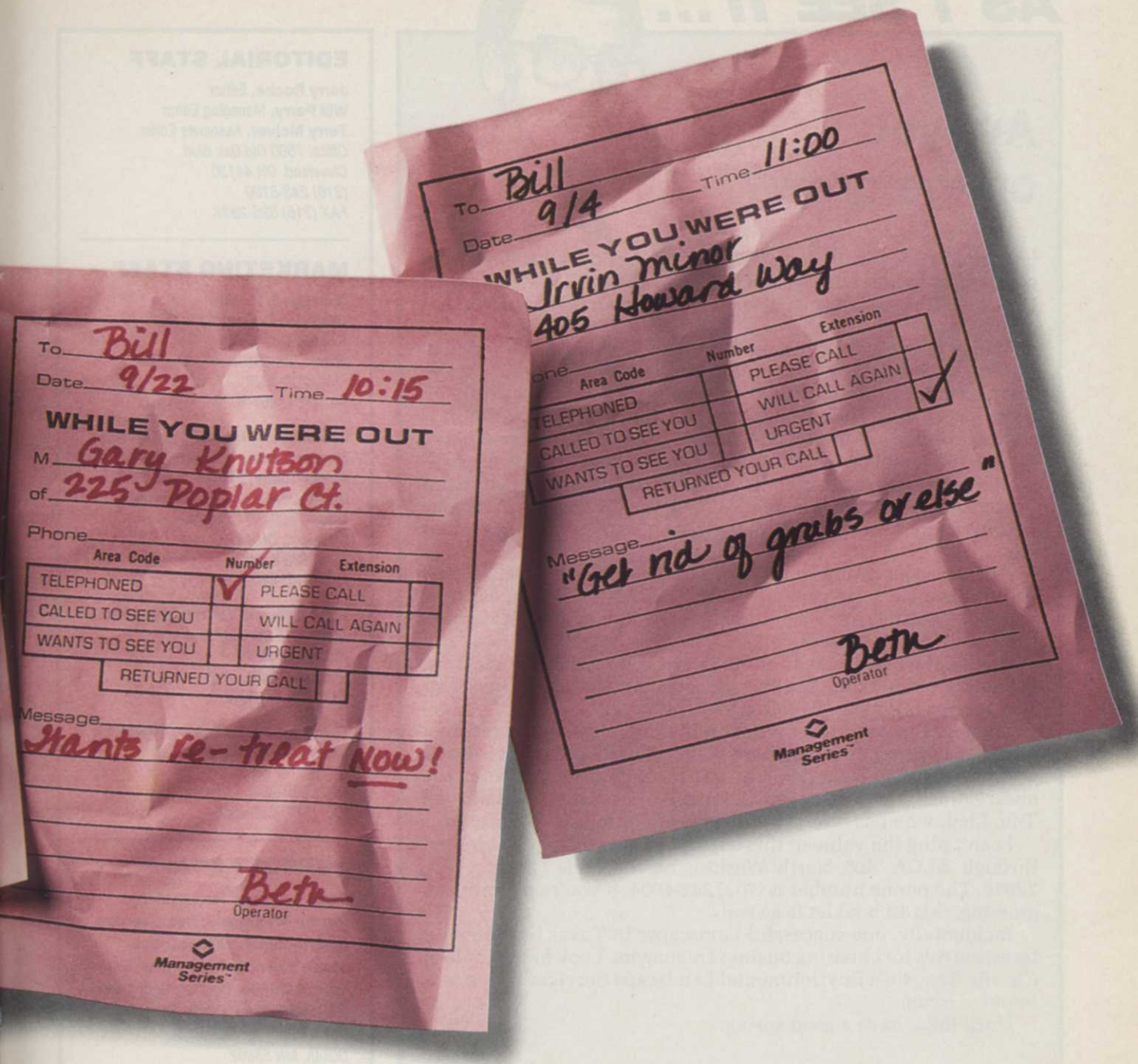

st turf pests, including these.

90 percent control of white grubs within just 2-3 days of application.

And, unlike other insecticides, Triumph consistently provides lasting control for a full 8-10 weeks. So one late summer or early fall application is all you need for effective turf protection.

Which doesn't mean you won't still collect notes from your clients.

Just that they'll more often be the green, negotiable variety.

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AS I SEE IT...

Are you on the grow?

Last month, we featured an article about the 50 largest landscape contractors in the country. Since our magazine reaches more than 12,000 landscape contractors, we'd bet that your company was *not* on the list.

Which means you're in a perfect mode to grow and be added to the list next year. But, according to the Associated Landscape Contractors of America (ALCA), most mid-sized landscapers have been historically bad at choosing management teams. When it comes to building *production teams*, it says, landscapers have done a reasonably good job. Why? Because most landscape contractors have been schooled in the horticultural sciences and not the business sciences. So when it comes to growing, the first place to grow is by choosing and organizing a top-flight management crew.

ALCA has just issued a new booklet titled "Crystal Ball Report VIII: Building a Management Team." And if your business bills between $500,000 and $2 million a year and you want it to grow, this booklet is an absolute *must*.

The booklet is divided into four major sections, the most informative being "Building the Management Teams." One of its subsections is called "Potential Pitfalls."

Some of the material covered in the brochure is covered on a monthly basis by our "Business Management" columnists Rudd McGary and Ed Wandtke. But the bulk of it comes from the observations of successful businessmen like committee chairman Tom Lied, who has one of the biggest operations in Wisconsin.

I can't plug the value of this booklet enough. It can be ordered through ALCA, 405 North Washington St., Falls Church, VA, 22046. The phone number is (703) 241-4004. If you're planning on growing, this $3 booklet is a steal.

Incidentally, one successful landscaper in Texas has some interesting tips for choosing business managers. Look for a profile of Charlie Racusin's Environmental Landscape Services Inc. in this month's issue.

Until then, have a good spring...

Jerry Roche

Jerry Roche, editor

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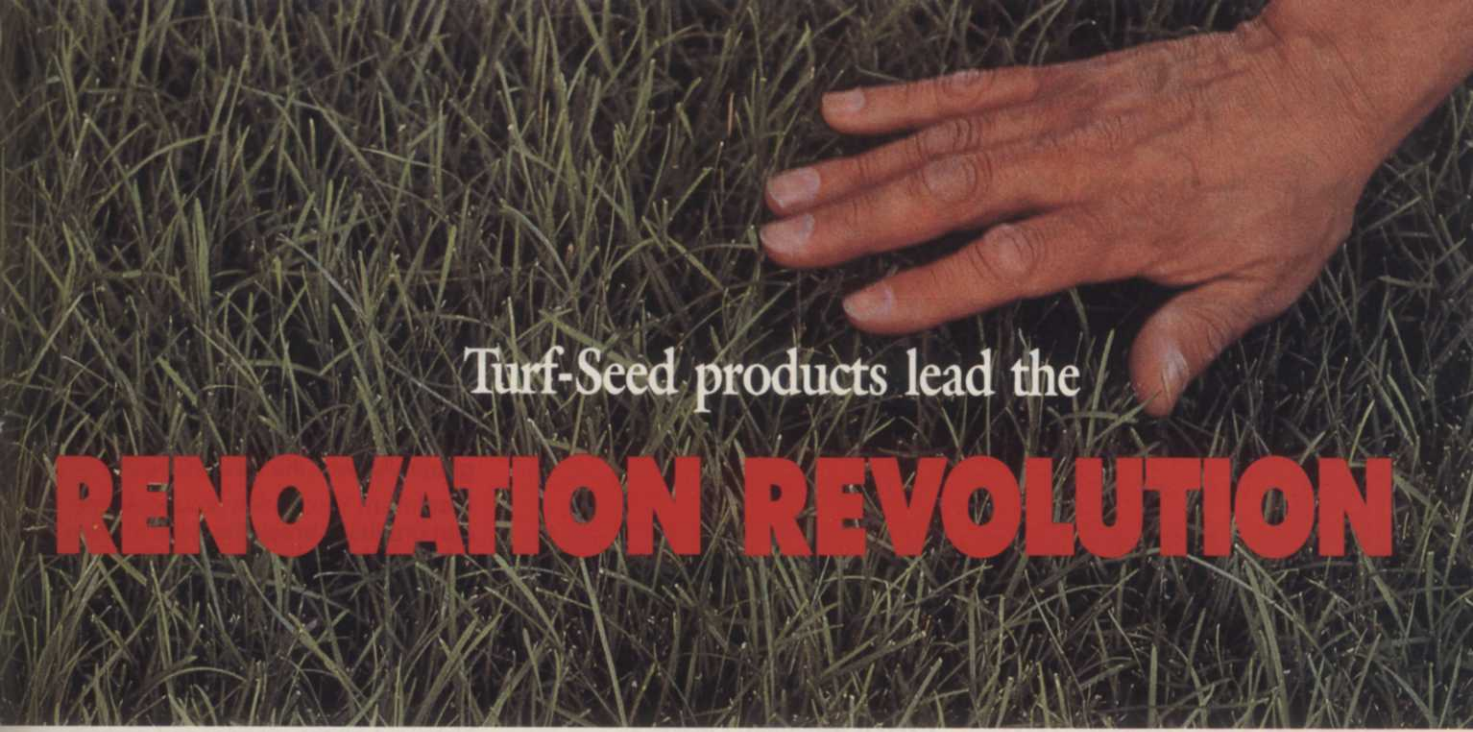

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How to reduce the cost of weed control today, tomorrow and beyond:

George Toma, Kansas City's own world-class groundskeeper, insists that most of us already know everything it takes not only to reduce the cost of herbicide but at the same time to improve the overall quality of the turf-grass. He contends that we simply need to keep reminding ourselves of those things we already know. In this edited version of a recent visit with him, he reviews those basic reminders.

Everett Mealman, President
PBI/Gordon Corporation

Mealman: George, we hear reports from time to time that you say the best way to reduce the cost of weed control is to stop using herbicide.

Toma: Yes, I've said that. But it's like the duffer who, after a bad round, said he was going to quit playing golf — not immediately, of course, but gradually over the next 20 years.

Mealman: You think a groundskeeper can gradually break the habit of using a herbicide to control weeds?

Toma: Yes, providing he can also break his turfgrass from the habit of associating with weeds.

Mealman: In other words, a herbicide program that is so good it eventually kicks out all the weeds, and a grass-growing program so good that the weeds can't get back in.

Toma: You've got it! At the Truman Sports Complex we're almost doing that right now. Today, we use no broadcast pre-emerge or post-emerge on the ornamental turf and landscaped islands around either stadium. All we use is some TRIMEC® Plus to spot treat for an occasional broadleaf or grassy weed.

Mealman: But, George, is this a realistic goal for a commercial lawn and landscape management company?

Toma: Absolutely! Of course, irrigation is a must, and you have to be involved in the sodding and seeding and fertilizing.

Mealman: What is the program?

Toma: Program isn't the right word. It's following through on the three

The Super TRIMEC treated turf on the perimeters of Arrowhead Stadium at the Truman Sports Complex is so immaculate that many visitors actually get down and feel it to find out for sure if it's real. George Toma tells Everett Mealman that the day he doesn't get a charge out of running his fingers through immaculate turf will be the day he hangs it up as a groundskeeper.

YOUR GUARANTEE OF A TRIMEC® COMPLEX PROFESSIONAL QUALITY

Super

basic fundamentals of cleaning up; keeping up; and building up.

Mealman: Can you enlarge on that?

Toma: Early spring is an excellent time to clean up . . . to clean out every weed, down to the very last root hair, so the turfgrass has a chance to thicken up. Whenever I am cleaning up some turf, I use Super TRIMEC® turf herbicide. I've never found a herbicide that does such a thorough job and yet requires such a small amount.

A big part of keeping up involves the green color you want in the spring and summer, and I always caution against using nitrogen during the growing season. Too much nitrogen in the spring and summer will result in too much top growth that weakens the roots and invites disease. To get color in the late spring and summer, I use Ferromec® Liquid Iron. Every year when they televise the Super Bowl, the announcers always rave about the beautiful color . . . that's no accident . . . that's Ferromec!

The time to build up is in the fall. That's when I pour on the fertilizer — and, if I reseed, I spray on Bov-A-Mura® (Natural Organic Activator). It does an excellent job of helping new seeds build strong roots . . . and I always use it whenever I lay new sod.

Dr. Jan Van Diepen shows a printout of a radioisotope tracer study to Everett Mealman and George Toma. The purpose of such studies is to determine the smallest possible amount of the strongest possible chemical formulation that can translocate to the root system of a weed and result in total control. Toma says, "We constantly test herbicides, and nothing is as efficient as Super TRIMEC."

Facts turf pros should know about Super TRIMEC

Super TRIMEC is a remarkable breakthrough in herbicide chemistry. To make it, we combine several esters with dicamba in a synergistic and homogenous complex in which every droplet is an excact mirror image of the total. No one except PBI/Gordon has ever been able to do this.

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But please note: The dicamba in Super TRIMEC is in acid form and is virtually insoluble in water. Therefore it is less likely to migrate in soil and endanger off-target ornamentals.

Because Super TRIMEC is so powerful, one gallon will cover four acres. And yet the spectrum is so broad that it controls even such tough species as ground ivy, oxalis and spurge.

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2) **Dramatically reduces the need for retreatments:** Super TRIMEC does it right the first time. Saves time and labor.

3) **Reduces herbicide costs:** You use less herbicide per acre and you spray fewer times per year. Both your weed control and your profits are better.

4) **Friendly to the environment:** Super TRIMEC uses less chemical. One gallon will treat four acres.

Yes, Super TRIMEC is a low-volatile ester. Yes, Super TRIMEC is labeled for professional use only. But you *are* a professional. Utilize your professionalism to increase your profits.

If you have any questions about Super TRIMEC, please call us.

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GREEN INDUSTRY NEWS

MARCH 1989, VOLUME 29, NUMBER 2

LANDSCAPE MANAGEMENT

Landscaping giants merge

CALABASAS, Calif. — Oyler Brothers Company, Florida's largest landscape maintenance firm, has merged with Environmental Care, Inc. (EC), the biggest such firm in the nation. Details of the financial transaction involved remain undisclosed.

Oyler Bros. Company was ranked fifth last year on *Lawn Care Industry* magazine's Million Dollar Mower list with annual revenues of more than $4.7 million. It has offices in Orlando, Jacksonville, Miami and Tampa. It will henceforth be known as Oyler Brothers Environmental Care, Inc.

Environmental Care, a subsidiary of Environmental Industries, Inc., has 1,000 employees at 15 branches in California and an annual revenue of $135 to $140 million, according to spokesperson Bob Scofield. This is the company's second acquisition outside California, its first in Florida.

"Our desire to consummate this arrangement with Oyler stems from the fact that it's a good, sound company that does quality work in a good marketplace," says Scofield.

Tom Oyler will remain at the helm of the Florida company, adds Scofield. Joining him will be EC's Gary Tungate, who will become branch manager in Orlando. No other management changes are anticipated. Says Scofield, "There is an excellent operation in place there (at Oyler) so there is no need to make wholesale changes," he says.

Merger principles, left to right: Bruce Wilson of EC, Tom Oyler, Burton Sperber of EC and David Rose of Environmental Industries.

The merger effectively puts Environmental Care east of the Mississippi River for the first time. Its influence on the landscape market will now be felt from coast to coast.

Asked about future plans for expansion in Florida, Scofield says "Environmental Care is a growth company. Obviously we're not going in there in order to remain the same size. Our hope is that the combination of these companies will enable those people who were developing Oyler Bros. to expand even more because we're bringing the strength of Environmental Care on board." □

STATES

Federal judge upholds New York legislation

NEW YORK — Federal Judge Neal McCurn has ruled in support of New York State's right to require warning signs and other printed material for pesticide applications. The ruling was in response to a suit by the New York State Pesticide applicators Coalition (NYSPAC).

The coalition claimed that the New York Department of Environmental Conservation's pesticide regulations were in violation of federal laws governing pesticide labeling.

Judge McCurn ruled that the DEC's notification requirements are a "complimentary adjunct" to federal law, to prevent unreasonable injury to man and his environment.

Options for NYSPAC include filing an appeal in either federal court or state court, or both, according to Walter D. Schroeder of the organization. "We have suffered many losses over the past six years," Schroeder wrote to NYSPAC members, "but we still continue to fight. If we did not fight, I have no doubt that they (the DEC) would have run over us by now. Even our losses have been victories because we slow them down."

Notification requirements under the state statute include 24-hour sign posting and signed customer contracts.

Other regulations that are not specifically spelled out in the statute, however, are on hold, pending a ruling by a state court. □

GOLF

Golf course building is up, architects say

CHICAGO - Golf course architects are approaching the "magic number" of new golf courses that must be built annually to cope with the increasing number of new players.

A survey of member firms of the American Society of Golf Course Architects reveals that 305 new projects and 268 remodeling assignments are in progress in the U.S. and Canada, both healthy increases from the previous year.

According to statistics from the National Golf Foundation, golf players jumped from 20.2 million in 1986 to 21.7 million in 1987. Based on those figures, the NGF projects that approximately 387 new courses (one a day!) would have to open annually to correct the disparity between the number of players and courses available.

"I honestly believe we could build 400 new courses a year if financing were readily available," says ASGCA president Pete Dye. "If financing manifests itself, then it will be the responsibility of the architect and builder to meet this challenge and produce interesting golf courses that will make those millions of new golfers glad they came out to the course." □

Lee Hellman

PESTICIDES

Deer tick moves into new areas

BALTIMORE — The deer tick population in the United States is spreading, and with it the threat of Lyme disease.

According to Lee Hellman, Ph.D., the pinhead-sized, Maryland-based pest has been detected in a downward migration into the Appalachians, and may soon reach Virginia and other southern states. Cases of Lyme disease have also been documented in Western states and other worldwide locations.

Hellman says deer ticks attack when in the nymphal stage, which is also the time they carry the Lyme disease virus. Adult females nest in rodents or pets, and then drop off in yards and fields to lay eggs. The first symptom of Lyme disease is a rash around the bite. If untreated, the rash will expand, and heart and nervous conditions or swollen joints may develop.

Two drawbacks in the battle against the disease are that only 75 percent of victims exhibit the rash symptom, and the disease is not always detectable in blood tests. According to Hellman, the disease can be easily controlled by antibiotics, but in some instances disease organisms have escaped the antibiotics and enter body tissue impervious to medication. There they will remain, causing recurrent symptoms.

"Lyme disease will be one of the major health control problems in the eastern United States," warns Hellman.

Hellman says the deer tick can be controlled by most materials now used against turf insects, such as Turfcam, Triumph, diazinon, Dursban, Sevin, or the soon-to-be-available insect growth regulators or synthetic pyrethroids. □

SHORT CUTS

MIDWEST HOT SPOT... The drought took its toll on the state of Michigan in 1988. **Paul Rieke**, Ph.D. at Michigan State University, says portions of the state had .83 inches of rainfall during May and June. Usual rainfall for that time is 6.07 inches. Michigan experienced 37 days above 90°, a mercuric rise from the usual 11 days. Average per day rainfall from April 24-July 15 was .05 inches.

HOUSES DOWN..."We predict that single-family housing construction will continue to inch downward but will remain above the one million unit level." That prognostication comes from **Stephen W. Scott**, vice president at JI Case. Case, of course, has a vested interest in housing construction because it manufactures construction equipment.

BE COUNTED... The Michigan Turfgrass Foundation has begun a survey of the Michigan green industry. The purpose, according to **Tim Doppel**, president of Atwood Lawn Spray, is to determine the size and earning power of Michigan's turfgrass industry. "We intend to use the results to show just how important the Michigan green industry is and thereby generate dollars to support research at Michigan State University," says Doppel, who is in charge of the project.

PR DEPARTMENT..."We all have a public relations department, whether we know it or not," says ServiceMaster vice president **Rick White**. White says "we are making impressions all the time on the people we serve and even people we don't serve." The four ways to impress people, hopefully positively: "the condition of our vehicles, answering the phones, the appearance of our employees and the quality of our work." White says "I think it's time for us to under-promise and over-deliver," instead of vice versa.

BUG DETECTOR...David Smitley of Michigan State reports the drought of 1988 greatly effected the insect populations in areas of Michigan. "European chafers and Japanese beetles expanded their territory, and there was some cutworm and bluegrass billbug movement onto golf course fairways because of the extreme contast to other drought-stressed areas." Some fairways, he reports, suffered 50 percent turf loss. Interestingly, home lawns in the state showed little insect damage, with 95 percent being strictly drought stress. In fact, many bugs packed up and moved out of those lawns to find enough moisture.

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A new kind of turf growth regulator that gives your course a bottom line boost:

More playability.

This is where perfect lies start on your fairway. New Cutless 50W from Elanco.

Unlike other turf growth regulators, new Cutless doesn't stop the development of warm and cool season turfgrass. Instead, it reduces or slows your turfgrass's growth rate by shortening the internodes of the growth stem with no adverse effects on their roots. The result is improved turf quality and more playable fairways.

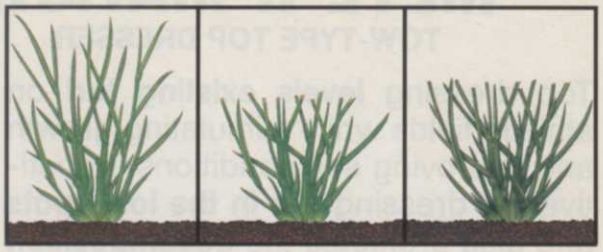
With Cutless, your turfgrass appears thicker and stronger for a denser, more consistent playing surface. Golf balls just naturally sit up better.

Cutless also reduces your water use, resulting in less turf wilt. And lower irrigation costs.

But Cutless does more than that. Much more. It also gives your turf a rich, darker green color.

Because Cutless-treated grass grows at a slower rate, there's also a dramatic reduction in clippings. Up to 50% less. With less mowing frequency. Also up to 50% less. You not only save time and labor costs, you can also manage your hard-to-mow areas more efficiently.

Here's another added benefit with Cutless. As your turfgrass grows up thicker and more competitive, there's less room for troublesome weeds to interfere. Cutless also helps crowd out *Poa annua* for conversion to a more desirable turfgrass such as bentgrass.



1. Sprig of grass in normal state.
2. Seven to 10 days after Cutless application, mowed sprig sometimes exhibits slight discoloration of treated area and leaf tip browning.
3. Growth reduction peaks between third and eighth weeks, accompanied by darker green coloration and increased tillering.

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Scott Niven
Superintendent, Stanwich Club
Greenwich, Conn.

"I've reduced clippings 30 to 50% when we mow fairways. My guys don't have to empty the baskets as much, so we save time and money on labor. But I think the best advantage is the reduction in the amount of water you have using Cutless. It's a marked difference.

"Initially, you get so little discoloration with Cutless that a golfer would never notice it. But after 4 weeks, the difference was between night and day on how dark green the Cutless turf was.

"Cutless helped us convert from 80% Poa annua *to over 95% bentgrass within five years. But I'm just as impressed with how Cutless creates a much thicker turf. It makes the grass as tough as nails, helps the ball sit up higher for our golfers."*

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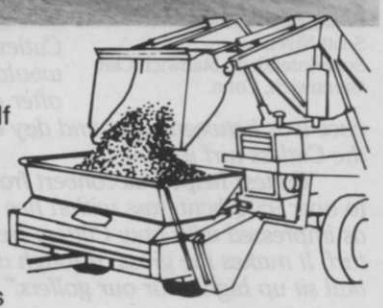

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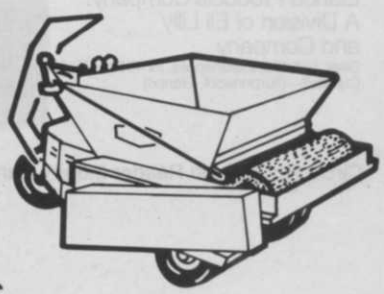

TURFCO MFG., INC.
3456 N. Washington Ave.
Minneapolis, MN 55412-2688

Ph. 612/588-0741
Telex 5106013762

TURFCO

Circle No. 188 on Reader Inquiry Card

NEWS *from page 11*

GOLF

GCSAA begins environmental management

LAWRENCE, Kan. — The GCSAA has contracted with Hall-Kimbrell Environmental Services to develop the first comprehensive environmental management program for the golf industry. Hall-Kimbrell is one of the nation's leading environmental consulting firms.

"We want to help superintendents make their golf courses as environmentally pleasant and safe as possible," says John Schilling, executive director of the golf superintendents association.

The GCSAA feels that coping with regulatory obligations and managing environmental and safety risks are increasingly being recognized as important professional priorities for its members.

The package being provided to superintendents consists of a Compliance Audit Notebook, an instructional videotape and additional printed material. The package deals with issues like pesticide handling and storage, worker safety, underground storage tanks, hazard communication standards and more.

It is available through the GCSAA, 1617 St. Andrews Dr., Lawrence, KS 66046. Cost is $725 for members and $900 for nonmembers. □

LANDSCAPING

Teamwork gets best results

BALTIMORE — Cooperation and teamwork between lawn care operators and customers remains a green industry issue. Clark Throssel, Ph.D. at Purdue University, believes one part of this relationship is to reconcile customer expectation with actual results.

Speaking to a packed house at the Maryland Turfgrass Conference, Throssel said operators must instill reasonable expectations by realistic statements made in person and in company advertising. "Don't create false illusions of the perfect lawn," Throssel advised. "Avoid statements like 'weed free' or 'grub proof.' Rather, say 'weed control' or 'grub management.'"

Throssel

Throssel also stressed the importance of homeowner involvement in post-treatment maintenance. "If they don't follow your suggestions," said Throssel, "the results will be less than expected."

Proper mowing height and proper watering are crucial to a successful program. "The numbers on the mower wheels do not refer to mowing height. If a customer says he is cutting at six inches, you can be sure he's looking at the numbers on the wheels."

Since many customers equate a lower height with a nicer lawn, the lawn care professional must advise them otherwise. "They need to know," said Throssel, "that lower mowing is harmful to root growth. The roots will not grow for five or six days afterwards."

"If your customers decide they'd like to experiment on their own," said Throssel, "let them know which species work best for that part of the country, and which species are incompatible. Turf-type tall fescue and Kentucky bluegrass, for example, will not be successful.

"The competition in the green industry has left a limited customer base," warned Throssel, who suggested being as helpful and available as possible. That means looking for and meeting with prospective customers on Saturdays and weekends. □

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The Instant Fountain™

A Good First Impression

Bold, Versatile, Creative. Our new mini-aerator line is attracting the attention of the most discerning landscape designers, nurseries, homeowners and private clubs. Small to mid-sized commercial and residential properties can now include these economical aerator-fountains in their landscaping plans.

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Definitely Appealing

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FAX (215) 965-6050 or write: BAREBO, Inc.
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Circle No. 184 on Reader Inquiry Card

TURFGRASS

New grass from the Emerald Isle

BELFAST, Northern Ireland — Logro, a dwarf variety of grass bred to grow not more than six inches high, is proving to be a boon to landscapers here. According to a press release, the grass is also being tested in Texas, parts of Canada, New Zealand and East Germany.

"Logro has a prostrate growth habit," says David Johnston, turf researacher for Queens University at the Horticultural and Plant Breeding Station in Loughgall, Northern Ireland. "It tends to grow horizontally along the ground with the result that there is good ground cover even after close mowing. It also maintains an attractive color, is disease-resistant and it needs to be cut about two-thirds as often as traditional types of grass. The potential for savings worldwide is unlimited."

Herbicide-resistant varieties called Duchess and Countess are now being tested.

"Both varieties will give a magnificent green sward of almost 100 percent purity," Johnston continues. "And recent trials in Texas have comfirmed that Duchess leads the field in terms of heat tolerance."

He sees money-saving uses for Logro on golf courses, athletic fields, schools grounds, office complexes, roadsides, cemeteries and airports. □

LANDSCAPING

ALCA study analyzes costs

FALLS CHURCH, Va. — A recent nationwide study reveals that cash flow is the most critical factor in the success of a landscape management company.

The 1988 ALCA (Associ-

Before you fertilize . . .

GET THE THATCH OUT!

knife reel

flail reel

According to turf experts, **excessive thatch** must be **removed** after a hard winter in order to have healthy turf in the spring. Thatch prevents **nutrients** from reaching down into the root structure. Result: the lawn cannot breathe and grow properly.

BlueBird has the **most complete line** of power rakes in the industry, a rake for every lawn and purpose. Spacings for every application. Interchangeable flail reels and knife reels are available for vertical mowing, and together they answer **every need** of lawn service professionals in every part of the country. Call your distributor **today** for a BlueBird catalog. For the name of your distributor call the BlueBird Action Center. BlueBird International Inc., 2778 South Tejon, Englewood, Colorado 80110. Phone (303) 781-4458.

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Beaver Creek Resort, Colorado

Get all the yellow nutsedge and none of the innocent bystanders.

Now you can really control yellow nutsedge from sod and ornamental grass* — without damaging the grass.

It's simple. Just put down BASAGRAN® herbicide from BASF. No need for you to be selective. BASAGRAN does that for you.

It's safe to grass and easy to use. And as effective against yellow nutsedge as anything you can buy.

Always follow label directions.

*Do not use on golf course greens.

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BASF

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Circle No. 194 on Reader Inquiry Card

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The Average Person's Idea Of Overpowering Allies.

Scotts TGR® Poa Annua Control has joined forces with the Penn Pals to help you win the war on Poa.

When you apply Scotts patented TGR Poa Annua Control to enemy-occupied territory, it weakens Poa annua, while Scotts controlled-release fertilizer helps surrounding bentgrass thrive and overtake the Poa.

On bentgrass fairways and greens, overseeding two weeks later with one of the Penn Pals (Penncross, Penneagle, Penn-Links or Pennway blend*) helps speed up

*Fairway use only.

The Scotts Tech Rep's Idea Of Overpowering Allies.

the transition to desirable turf. Soon you can stand astride lush fairways and greens and declare total victory.

Your Scotts Tech Rep is ready, willing and able to help you plan your attack, and supply your TGR Poa Annua Control and creeping bentgrass needs.

For more information, contact your Scotts Tech Rep or simply call 1-800-543-0006.

Scotts®
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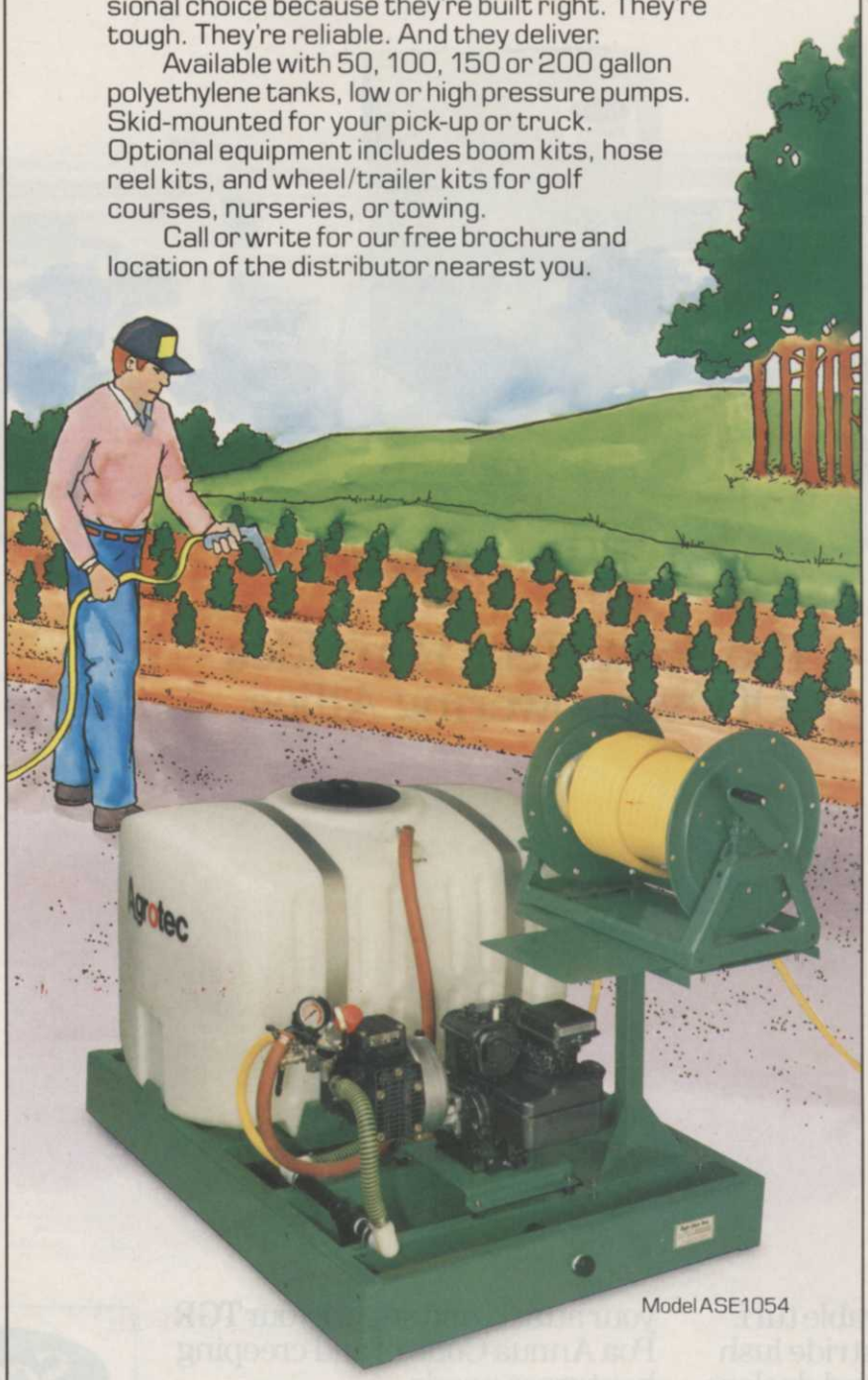
Whether you spray once a day or 20 times a day, 50 gallons or 200 gallons, golf courses, tall trees, or commercial landscapes, you need a PRO-CARE Sprayer from Agrotec.

Agrotec PRO-CARE Sprayers are the Professional choice because they're built right. They're tough. They're reliable. And they deliver.

Available with 50, 100, 150 or 200 gallon polyethylene tanks, low or high pressure pumps. Skid-mounted for your pick-up or truck. Optional equipment includes boom kits, hose reel kits, and wheel/trailer kits for golf courses, nurseries, or towing.

Call or write for our free brochure and location of the distributor nearest you.



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Circle No. 102 on Reader Inquiry Card

ated Landscape Contractors of America) Operating Cost Study examines financial information provided by 326 contractors. The study was done by Ross-Payne & Associates of Barrington, Ill.

The study presents model financial ratios and industry averages for three separate groups of contractors: exterior landscapers, landscape management firms and interior plantscapers.

The study notes that while contractors have incorporated better management practices since 1979, profits have fallen by more than 50 percent. Much of this is attributed to their inability to pass along equipment cost increases.

Major categories include assets, liabilities and equity, sales, gross margin, indirect overhead, administrative overhead, and net profit before taxes.

In addition to the total averages, separate sets of averages are presented for three different revenue groups: under $750,000, $750,000 to $2 million, and over $2 million.

The report also explains various financial ratios, such as debt-to-equity, net fixed to current assets, degree of fixed asset newness, and others.

The 64-page study costs $20 for ALCA members and $30 for non-members. For information, contact ALCA at 405 N. Washington St., Falls Church, Va. 22046. (Phone: 703-241-4004.) □

LAWN CARE

Public image an issue for '90s

STATE COLLEGE, Pa. — First, some stats: recent industry surveys indicate 30 percent of a potential 7.5 million single-family home lawns are being treated by professional applicators. The EPA has detected traces of 17 pesticides in 23 states' groundwater. Fifteen others have been detected, but their sources are not identified.

continued on page 22

Keep your reputation spotless.

Golfers may not know leaf spot by name, but it can mark the difference between your course and someone else's.

DYRENE® 4 Turf Fungicide has been effectively controlling leaf spot for years. And for every day of control you get, nothing costs less.

DYRENE 4. Proven control. Because we have a reputation to consider, too. For more information, contact Mobay Corporation, Specialty Products Group, Box 4913, Kansas City, MO 64120.

Dyrene 4

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In the under 40-hp game,

Introducing the new compact tractor lineup from John Deere. Now you have a choice of nine models all under 40 horsepower.

The new 70 Series Tractors have a brand new look. And a brand new set of performance features to choose from.

Including collar shift and synchromesh transmissions, continuous live PTOs and power steering to name a few.

But no matter which performance package you select, the new 70 Series are packed full of other improvements you've been waiting for.

Durable cast-iron constructed "TN" series engines provide increased power and improved fuel economy.

Like a new, open operator's station for an uncluttered working area. New fuel efficient "TN" series engines. Plus loader/mower compatibility just like we have on our 55 Series

we've got the bases covered

Tractors.

And speaking of the 55 Series, there's a new member in this family, too.

The 33-horsepower 955.

This new hydrostatic model comes with all the same features that made our 55 Series a big success. Plus one more feature you've been asking for. More power.

See the full line of John Deere tractors soon. Or write John Deere, Dept. 67, Moline, IL 61265. After you see them we think you'll agree, when it comes to compact tractors, we've got the bases covered.

SAFETY live with it

New 70 Series operator's station features a roomy platform for an uncluttered working area.

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GET SERIOUS
ABOUT HYDRO-MULCHING

Bowie Industries invented the Hydro-Mulcher.® And whether you specialize in large or small projects, Bowie makes a Hydro-Mulcher that will save you money. The Bowie Victor 800 is ideal for lawn and landscape jobs.

Like all our equipment, the Victor 800 is built Bowie tough for long, trouble-free service. Its 800 gallon tank can easily spread 350 pounds of mulch over 8,000 square feet in one application. The Bowie Victor 800 is equipped with a built-in shredder bar, and uses twin agitators to keep slurry homogeneous. Call or write Bowie today. We make serious equipment for serious landscapers.

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Circle No. 108 on Reader Inquiry Card

NEWS *from page 18*

For these reasons, Scott Harrison of Penn State University believes the industry must consider the influence of turfgrass and landscape management on water quality, and how lawn care is perceived in the public eye.

Harrison has collected data with respect to nutrient and pesticide use in urban/suburban landscapes. He knows the present aggressive regulatory stance on pesticide use will affect every companies' programs, but he does not recommend a defensive posture.

"We have to adjust our management procedures. The industry must police itself rather than be negative," he says. He advises high standards of cleanliness, chemical disposal and personnel training. He also recommends "more intelligent landscape designs," using low maintenance, low nutrient requirements, and more customer education on environmental issues.

"If we're going to deal with the regulatory situation and a high degree of public scrutiny," concludes Harrison, "we must keep these things in mind." □

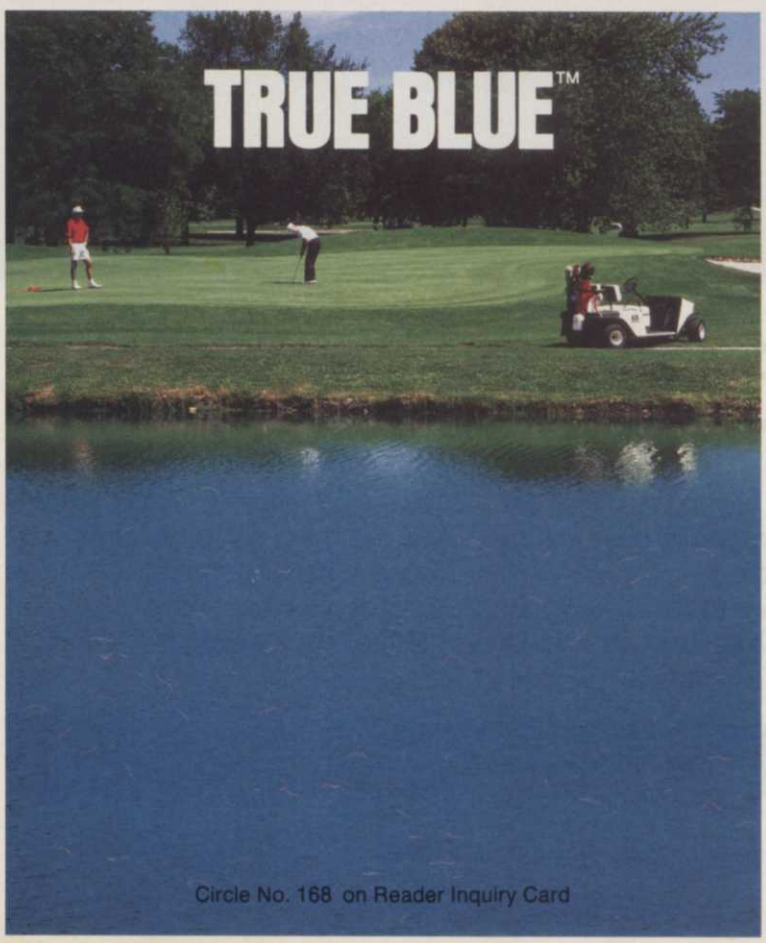
MANAGEMENT

Assist programs fight drug abuse

BALTIMORE — If you live in Maryland and believe employee drug abuse is a problem at your company, call Bill Lowry at (301) 225-6873.

Lowry, an official with the Maryland Department of Alcohol and Drug Abuse, addressed the Maryland Turfgrass Conference recently on how to identify and deal with drug abuse among employees, something he believes affects many companies at alarming rates.

According to Lowry, generally 20 percent of the nation's workforce is im-



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Why settle for artificial looking dye when TRUE BLUE™ will give your lake or pond a natural, living color appearance. The secret's in our tried and true blue formula that makes the other brand look unnatural by comparison.

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One look tells you. A golf course just doesn't reach this level of beauty and playability without effective control of turf diseases.

Like large brown patch. When tees, greens and fairways come under its attack, things can get u-g-l-y.

Unless you attack back—with Rubigan, tank-mixed with a contact fungicide (Daconil 2787®, Chipco® 26019, or a thiram product).

This adds even more knock-down power to Rubigan's extended disease control. Just one application can clean out even a heavy presence of brown patch for 10-14 days.

One Rubigan treatment also can keep your course dollar spotless—up to 28 days. One case of Rubigan will treat up to 4 acres of greens and fairways. It gives you powerful preventive action against anthracnose too.

This year, make Rubigan your foundation fungicide. Find out how quickly large brown patch and 13 other common turfgrass diseases find themselves overmatched. See your Elanco distributor. Or call toll-free: **1-800-352-6776.**

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Rubigan®—(fenarimol, Elanco)
Daconil®—(chlorothalonil, Fermenta Plant Protection)
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Extends brown patch control up to seven days when tank-mixed with a contact fungicide.

Circle No. 120 on Reader Inquiry Card

Brown patch is no match for a Rubigan® tank mix.

To find an
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elite
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at a
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price, you
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the lines.

Compare Fylking's competitive price and advantages! Fylking forms a thick, lush turf that has improved disease and drought resistance. Fylking greens up earlier, stays green longer; can be cut as low as ¾ inch—even ½ inch. Fylking has been proven over many years of international turf testing.

Ask your seed distributor for Fylking.

FYLKING
KENTUCKY BLUEGRASS
U.S. Plant Patent 2887

Another fine, quality controlled product of Jacklin Seed Company

Circle No. 137 on Reader Inquiry Card

paired by alcohol, drugs or emotional problems, and probably 12 percent of any given workforce has a measurable alcohol or drug problem, resulting in massive financial losses for companies.

"We estimate that a company that has 1,000 employees with a $25,000 per capital salary will lose $1,125,000 due to absenteeism, overtime, tardiness and insurance claims." That figure does not include the costs incurred by poor decision-making on the part of the employee.

Lowry believes the antidote lies in employee assistance programs, a means whereby company superintendents report problem employees, or the employees are encouraged to come forward on their own with no threat of dismissal.

According to Lowry, most companies are too small to afford a program on their own. He notes that some companies are contracting with private, outside consortiums which establish a group assistance program for a number of companies.

In the meantime, Lowry recommends you look for signs that indicate drug or alcohol use is a problem: poor attendance, frequent absences, especially after weekends or holidays, unexplained disappearances, long lunches, or an adverse change in the employee's performance or personal appearance. □

LANDSCAPING

More production to meet goals

NASHVILLE, Tenn. — Do you envision your landscaping company as a "production company?" Are you fluent in "production language," and do you generate "production numbers" to set goals and judge the output of your employees?

If not, perhaps that's the reason why business is up one month, down the next.

In a back-to-the-basics seminar at the Landscape Expo here, Phil Christian of PDC Consultants seemed to be saying that the idea of "production" is a mind-set needed for consistency.

A production company should be organized so the entire company serves as a support system for each crew or "production unit." The units consist of labor, equipment, material and transportation. The production company must make timely and accurate production numbers on a project-by-project basis. Production goals are set by management, which monitors each crew's progress, making the necessary adjustments as needed.

Safety is another benefit of the production company. Training activities are structured around safe and correct procedures, strictly enforced by the crew chiefs.

"Increased productivity should produce an increase in quality if the production procedures are followed," advises Christian, "and projects are produced on schedule."

According to Christian, the importance of each production unit stems from policies and procedures designed to promote quality production. Good policies meet with little interference from management or managers.

Christian's theory of over-production says that the production units should be structured to meet any goal. □

Correction

On page 46 of the February issue, a riding mower was misidentified. What was a Woods/Hesston Model 3150 is mistakenly identified as an Exmark 3150.

Woods/Hesston is an Oregon, Ill.-based manufacturer of professional lawn mowers. Exmark is based in Beatrice, Neb.

Three ways Mazda trucks outperform the competition.

1988 Mazda B2200

If you're about to commit your company's resources to building a truck fleet, you've probably looked at Ford Ranger, Chevrolet S-10, Toyota and Nissan. But your shopping list isn't complete until you've taken a good look at Mazda. Because Mazda trucks offer some very important advantages over the competition.

Mazda trucks: Number one in overall customer satisfaction for three straight years.*

1986	1987	1988
MAZDA #1	MAZDA #1	MAZDA #1
TOYOTA #2	TOYOTA #2	TOYOTA #2
NISSAN #5	NISSAN #3	NISSAN #4
CHEVROLET S-10 #6	CHEVROLET S-10 #7	FORD RANGER #8
FORD RANGER #9	FORD RANGER #9	CHEVROLET S-10 #10

Mazda B2200 Cab Plus. Combining spaciousness with practicality, the Cab Plus is the first extended-cab compact truck that allows two adults to sit facing forward in optional rear jump seats.

Mazda trucks: Offer a 36-month/50,000-mile "bumper-to-bumper" warranty—The best in the truck business.**

MAZDA	TOYOTA	NISSAN	FORD	CHEVROLET
36 MONTH 50,000 MILE WARRANTY	36 MONTH 36,000 MILE WARRANTY	12 MONTH 12,500 MILE WARRANTY	12 MONTH 12,000 MILE WARRANTY	12 MONTH 12,000 MILE WARRANTY

Mazda trucks: Offer the most truck for your money.†

Standard Features	Mazda B2200 Base	Toyota Standard	Nissan Standard	Ford Ranger "S"	Chevrolet S-10 "EL"
5-speed	Standard	N/A	N/A	Standard	Standard
Automatic transmission	Optional	N/A	N/A	N/A	N/A
Double-wall cargo bed	Standard	Optional	Standard	Standard	Standard
Tinted glass	Standard	Optional	N/A	N/A	Optional
Steel-belted radials	Standard	Optional	Standard	Standard	Standard
Full carpeting	Standard	N/A	N/A	N/A	N/A

To find out even more ways Mazda outperforms the competition, contact:
Fleet Department, Mazda Motor of America, Inc.
7755 Irvine Center Drive, Irvine, CA 92718.
Or call (714) 727-1990.

*J.D. Power & Associates 1986 and 1987 Compact Truck CSI and 1988 Light-Duty Truck CSI customer satisfaction with product quality and dealer service. **See your Mazda Dealer for limited-warranty information.
†Comparisons with other makes based upon available competitive data.

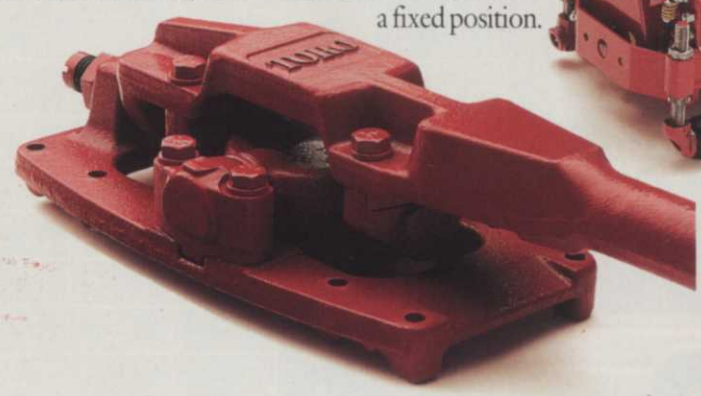
mazda

Circle No. 149 on Reader Inquiry Card

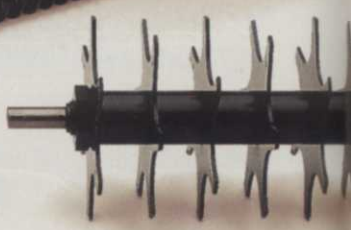
It Stopped Just To Have Its P

You're witnessing a rare sight. Toro's Reelmaster® 450-D actually standing still. A rare sight because the Reelmaster 450-D is so dependable that it goes and goes and goes. Giving you the high capacity mowing and precise even cutting you've been looking for.

Each cutting unit is connected to a universal joint, so it can float freely in any direction, following the contour of the turf for an even, uniform cut. Or can be locked in a fixed position.



The Toro 450-D gives you protection against hydraulic fluid leaks. Wherever possible, hoses have been replaced with strong steel lines and O-ring seals protect connections. A hydraulic warning system flashes an alarm when the fluid level drops. For easy servicing, test ports for the hydraulic system are right on the side of the machine.



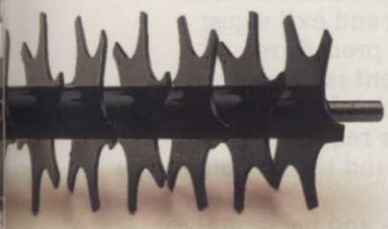
The Reelmaster 450-D can be customized with these accessories: ROPS, Cab, 5- and 7-bladed reels, rollers and thatching reels.

The Toro Company, Commercial Marketing Services, 8111 Lyndale Ave. So., Minneapolis, MN 55420.

t Long Enough
icture Taken.

Toro's exclusive variable clip control allows you to calibrate reel speed and mowing speed to give you the highest quality of cut in varying course conditions. Combine that with faster mowing speeds, up to 7.5 mph and 12.5 mph transport speed, and you're going to witness an increase in productivity. All controls are in easy reach of the operator to provide greater comfort.

The 450-D is designed with its weight evenly distributed around a center-mount 50 hp engine for better balance. This means more uphill climbing ability than other machines and better traction.



Compared to tractor gang mowers, the Toro 450-D weighs less and is equipped with wide 31-inch tires that spread the weight for the lowest PSI, further minimizing turf marking.

For faster, easier mowing with more beautiful results, call your local Toro distributor for a demonstration of the Reelmaster 450-D or contact Toro at the address below. A machine built from the ground up with proven Toro design experience. And that translates into the kind of productivity no one can argue with.

TORO

The Professionals That Keep You Cutting.

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Circle No. 187 on Reader Inquiry Card

WIPE OUT INSECT PESTS.

Here's broad spectrum protection that can wipe a whole line-up of insects right out of the picture: ORTHENE Turf, Tree & Ornamental Spray.

Cleared for use on a long list of trees and plants, ORTHENE is also cleared for turf insects—including mole crickets in Florida. With ORTHENE, one spray kills pests like tent caterpillars, whiteflies, Japanese beetles and thrips on contact. Also, use ORTHENE for lasting residual action against other insects from aphids to sod webworms.

ORTHENE kills both on contact and by systemic action. It makes the whole job of protecting lawns, golf course turf, trees, shrubs and flowers simpler, more convenient and more effective. Give yourself the edge against insects. Control them with ORTHENE Turf, Tree & Ornamental Spray.

Avoid accidents. For safety, read the entire label including precautions. Use all chemicals only as directed. Copyright © 1989 Valent U.S.A. Corporation. All rights reserved. ORTHENE® is a registered trademark of Chevron Chemical Company.

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ORTHENE®

TURF, TREE & ORNAMENTAL SPRAY

Circle No. 110 on Reader Inquiry Card

Kurtz leaves STMA

Kent Kurtz, Ph.D., has resigned as executive director of the Sports Turf Managers Association after four years.

Kurtz, a member of LANDSCAPE MANAGEMENT's editorial advisory board, is a professor at Cal Poly/Pomona. With those duties and all the advisory positions he holds, he was finding his schedule too full to continue as executive director. "Four years is a long time, too," he told LM.

Mark Hodnick, president of STMA and supervisor of landscape services at Cal Poly/Pomona, is handling what were Kurtz's responsibilities.

Are you a prudent manager?

If you're worried about being sued by someone who was injured using your field, ask yourself if you manage that field in a reasonably prudent manner, says Elyzabeth J. Holford, J.D., of Virginia Tech University.

"Your duty in a nutshell is to refrain from creating a situation where there is an unreasonable risk of injury," says Holford.

Holford told attendees of the 29th Annual Virginia Turfgrass Conference that lawsuits against athletic field managers are more and more common. That's because of an increase in leisure time, which means more athletes are suffering more injuries; more lawyers "who have no qualms about taking any case to court"; and the "consumeristic" society of today that says: "I paid to use this field so it better be safe."

What can you do to protect yourself? "Often the simplest things are overlooked," says Holford. She stresses the importance of meeting all federal, state and especially local regulations regarding athletic fields. Also:

- clearly post warning and exit signs;
- rehearse evacuation procedures;
- conduct and document regularly scheduled maintenance checks;
- keep a file of all your requests for maintenance and repair, and the responses you received; and
- use quality materials and personnel for turf installation and repair.

"If you can't afford the highest quality people or materials you're telling me you can't afford a lawsuit, yet you're willing to take the risk of incurring one," she adds.

Making playgrounds safer

Though playground equipment ranks fifth on the list of the 100 most hazardous consumer products, there are steps a facility

manager can take to make playground areas safer, says William C. Hoover, Department of Parks and Recreation, City of Charlottesvile, Virg.

"It is my opinion that proper design, construction, inspection and maintenance are the key elements in providing a safe and enjoyable playground area," said Hoover at the 28th Virginia Turfgrass Conference.

Important construction considerations include a good drainage system, enclosing the area with a border that is at least eight to 10 feet away from any apparatus and increasing many of the manufacturer's installation recommendations. "We recommend increasing the amount of concrete and the size of holes dug for footing," says Hoover. "All footings should be a minimum of two inches below rough grade finish to avoid problems with the concrete protruding into the finished area."

There are many organic and inorganic materials you can use to provide a surface that offers a maximum cushioning effect. He recommends a combined depth of no less than 10 to 12 inches. "It has been our experience that the most effective surface materials are shredded rubber and pinebark mulch," says Hoover. "The shredded rubber is our best surface because it's safe, has good longevity and durability and is easy to maintain."

Athletes prefer new turf

Researchers at the University of California, Riverside (UCR) say that the new cool-season turf varieties adapted to the Southwest climate provide better cushion and are therefore safer for athletes than existing varieties.

"Results from our study indicate that new perennial ryegrass varieties offer important safety features for football and baseball players, especially during the winter months when Bermudagrasses are dormant," says Stephen T. Cockerham, leader of UCR's sports turf research program.

UCR researchers tested 53 varieties during the four-year study. Citation II was reported to have performed the best under the stress of serious sports traffic, but not statistically better than eight other varieties.

"As improvements continue in the development of cool-season turfgrasses adaptable to the Southwest, sports field management will change dramatically," predicts Cockerham.

Whatever sort of grounds you manage professionally, DIQUAT Herbicide H/A can help you keep them clean and trim. With its fast-acting formula, DIQUAT gives rapid burn-down, usually within 24-48 hours, of a wide variety of annual grasses and broadleaf weeds. DIQUAT has a proven track record for getting rid of unwanted grasses and weeds, even under less-than-ideal weather conditions. A non-selective contact herbicide, DIQUAT will burn back or control nearly anything green to which it is applied.

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HERBICIDE H/A

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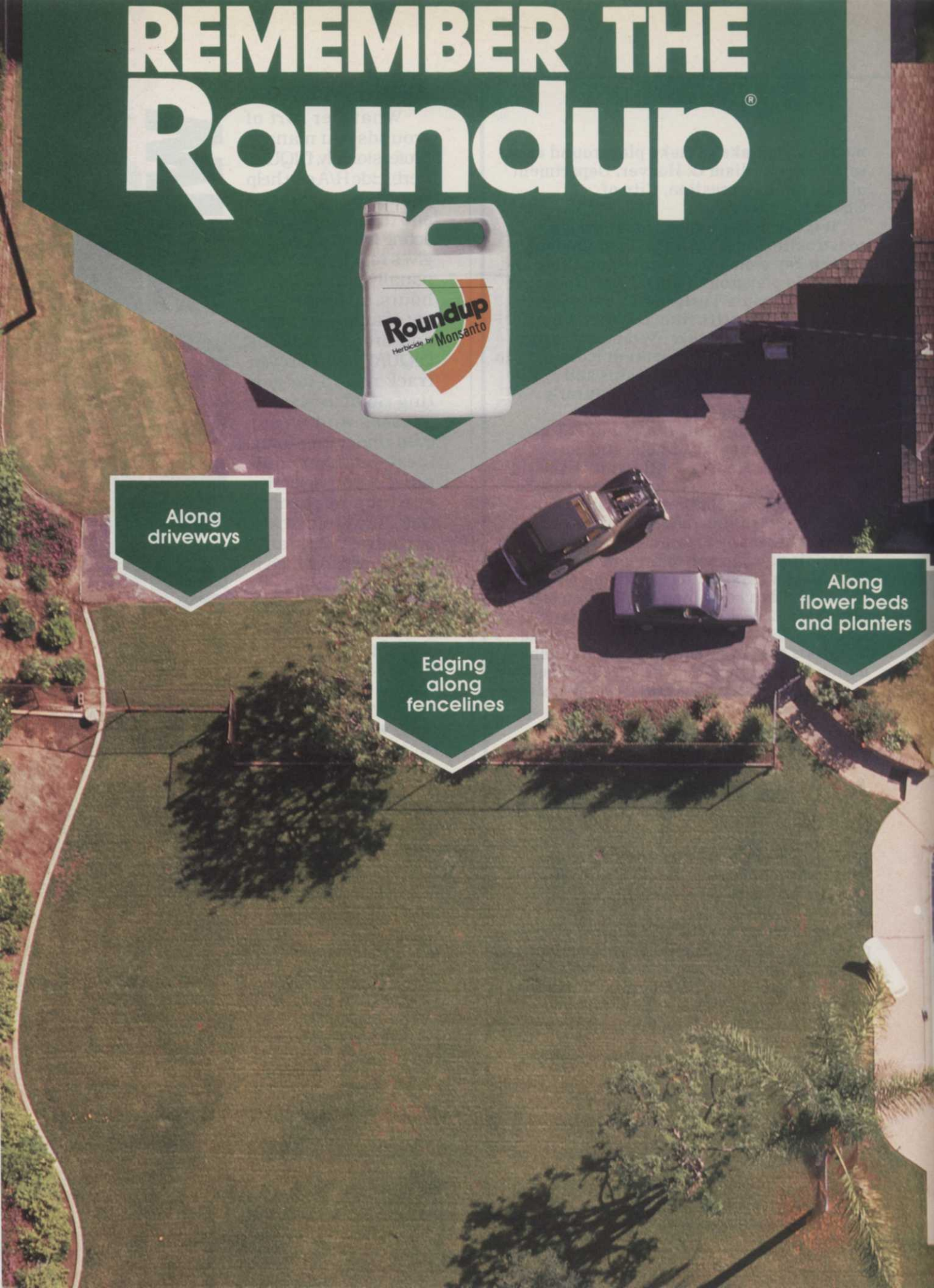
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LETTERS

To the editor:

In your December issue, in the "Problem Management" section, Dr. Balakrishna Rao comments on controlling two major turf pests without mention of either Banner or Triumph.

In our recently-completed research study, the largest ever conducted in the U.S., Banner gets among the highest ratings for anthracnose control. This is further supported by Dr. Joe Vargas' research.

With Trumph, we not only have a new 24(C) label for all major turf uses in Florida, but the product is recognized as being especially effective on mole crickets. Triumph will become a major factor in this important market in 1989. While the biological data on mole crickets is informative, the recommended alternatives for effective control are not current with the newest labels.

Joe Prochaska
Ciba-Geigy
Greensboro, S.C.

To the editor:

I always enjoy reading your excellent publication and look forward to all the interesting articles and information. I have a file that I add to when I see an article worth saving, and I pull it out of the magazine and file it for future reference. I have a degree in horticulture, but I think I've learned more from your magazine than from many of the courses I took in school.

In reference to "Jobtalk" in the December issue ("Thorny flora makes a good-looking fence"), I can't see using this plant in any commercial applications considering our litigation-happy society. Installing such a dangerous plant capable of inflicting "pain and terror" in our area would be considered an extreme liability almost inviting lawsuits. Military installations—justified—but not in the public arena where careless children and adults abound.

Chuck Wills
Minyard Properties
Coppell, Texas

To the editor:

I was quite pleased to see the article "Firm Provides Temporary Help" in Green Industry News (January, 1989 LM).

The majority of our business revolves around making permanent placements. Most of our workers are looking for full-time jobs and are willing to relocate anywhere in the country.

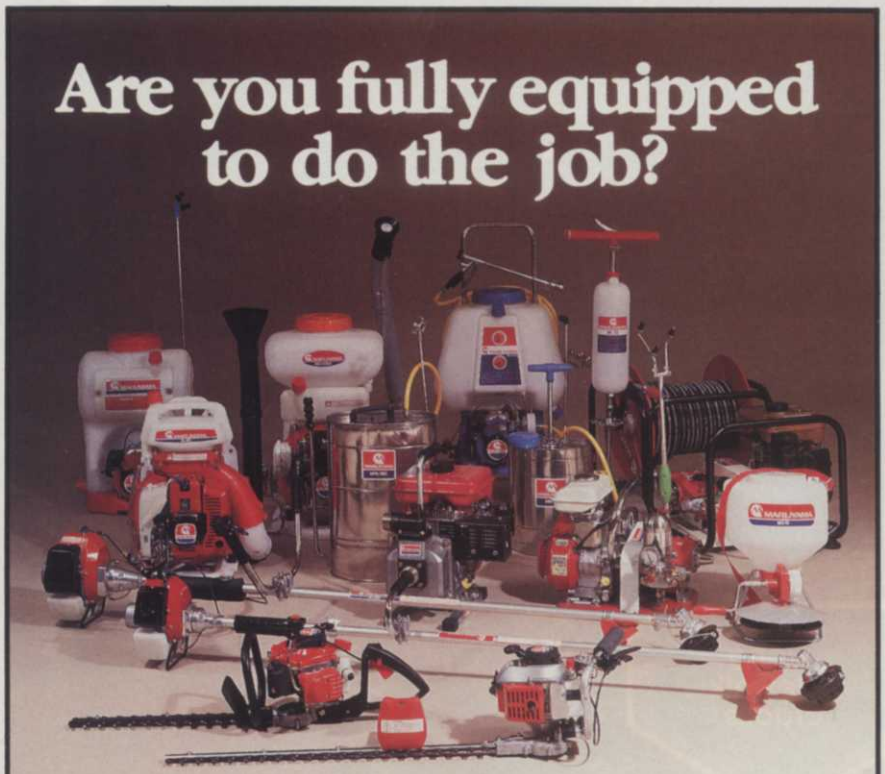
To date, we have placed workers in 17 states. All have been documented under the Immigration Reform and Control Act of 1986.

In addition to placing laborers, we also find employment for landscape and irrigation foremen, superintendents, production managers and designers.

We find the biggest problem facing a potential employer is which applicant to choose!

Robert Wingfield
Amigos Empleo Legal, Inc.
Dallas, Texas

Are you fully equipped to do the job?



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Circle No. 271 on Reader Inquiry Card

PEOPLE

Beliczky named marketing director

Mark W. Beliczky has been named director of marketing for LESCO, Inc., of Rocky River, Ohio.

Beliczky signs on with LESCO after an eight year assignment with ChemLawn Services Corporation, where he serves in a variety of corporate and operations management posts.

David L. Peiffer is the new director of landscape

M. Beliczky

D. Peiffer

services and regulatory affairs for the American Association of Nurserymen.

Peiffer has 12 years of association management experience, and will serve as administrator of the National Landscape Association and staff coordinator for AAN regulatory affairs.

Betsey T. Lyon is the AAN's new director of edu-

J. Albizo

B. Lyon

cation and publications. Lyon is a communications professional with 10 years of association experience. She now edits AAN's official magazine and directs educational programs.

Joel D. Albizo is the association's new director of advertising and public relations. He was former director of marketing and communication for the National School Supply and Equipment Association.

The San Diego office of Vander Kooi & Associates has a new consultant, **Kevin Persons**. A landscape contractor for several years, Persons has been involved in various residential and commercial projects, and is an expert in landscape construction and irrigation.

Brouwer Turf Equipment has promoted **Ian True** to the post of North American sales manager. True carries more than 10 years of company product knowledge to his new post and plans to increase company sales and strengthen its dealer network.

Wilbur Mull of Classic Nurseries has resigned from the board of directors for the Garden Centers of America, having sold his garden center to business partner Joe Gayle.

"It would not be right for me to represent GCA as its president and be a retailer," Mull said.

Oregon State University student, **Gary Yates**, has received a NOR-AM Chemical Company scholarship for the 1989 scholastic year. The award helps students meet educational expenses and is given on several factors.

William E. Dunn is now sales manager for Lofts' Professional Turf Division. He is responsible for sales and service to independent garden centers, the lawn

G. Yates

I. True

care industry, landscape contractors and suppliers, professional landscape and athletic field managers and sod growers.

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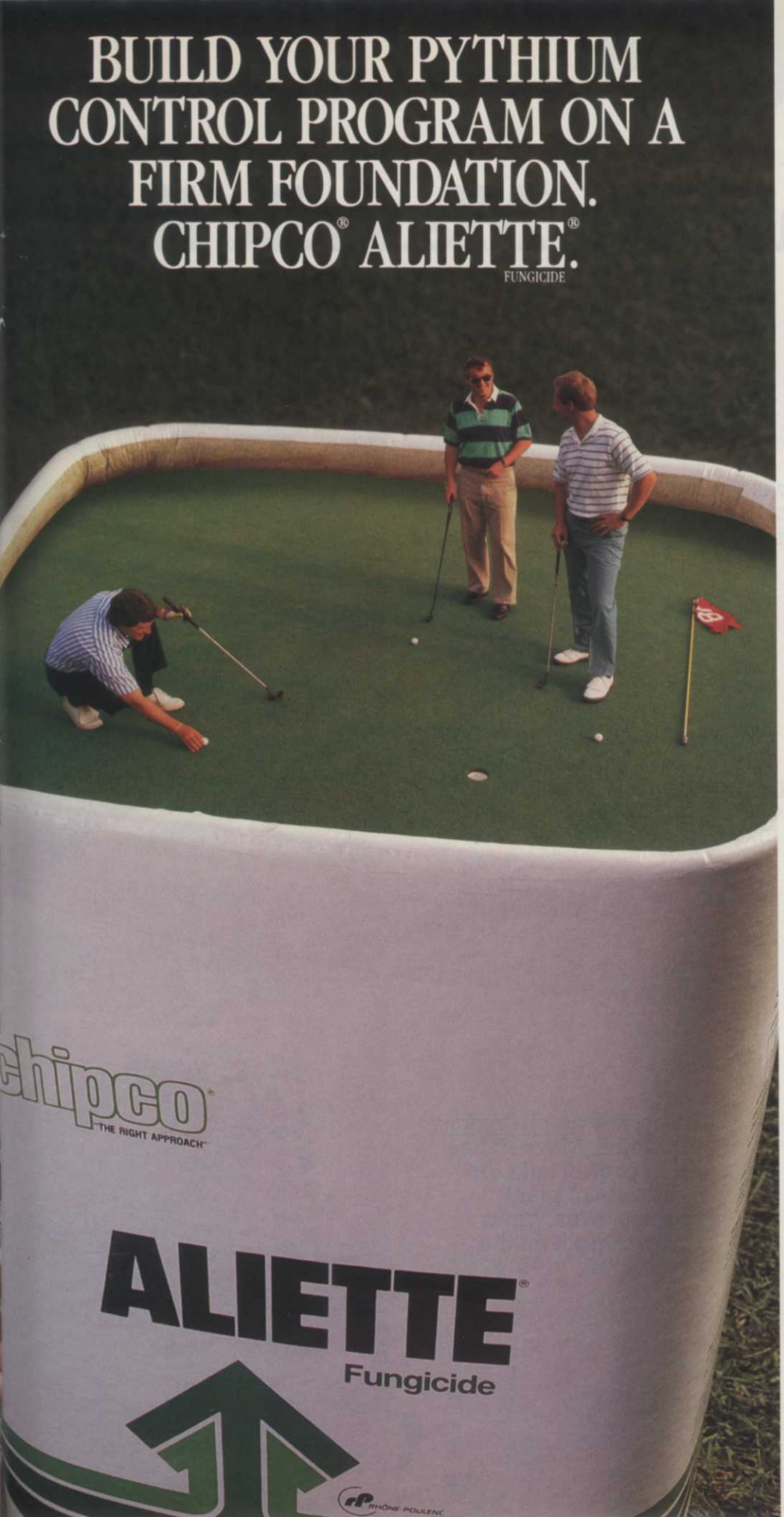
FUNGICIDE



Only CHIPCO ALIETTE fungicide translocates throughout your turfgrass for total Pythium protection.

If you're like many golf course superintendents, you rotate fungicides to reduce the risk of disease resistance. But you still need a "foundation" product you can count on for effective, long-lasting Pythium control. And the name of that product is CHIPCO ALIETTE fungicide.

Unlike other turf fungicides, CHIPCO ALIETTE fungicide features a unique two-way systemic action. Once applied to turf, its active ingredient translocates downward and upward throughout each grass plant. The result: total disease protection from top to bottom.

In addition, CHIPCO ALIETTE fungicide offers you 21 days of Pythium protection from a single application. Even in hot, humid weather, CHIPCO ALIETTE fungicide stops Pythium *before* it gets started.

Best of all, CHIPCO ALIETTE fungicide delivers long-lasting pythium prevention at a down-to-earth price. In fact, CHIPCO ALIETTE fungicide is one of your best fungicide values based on cost per day of control.

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FUNGICIDE

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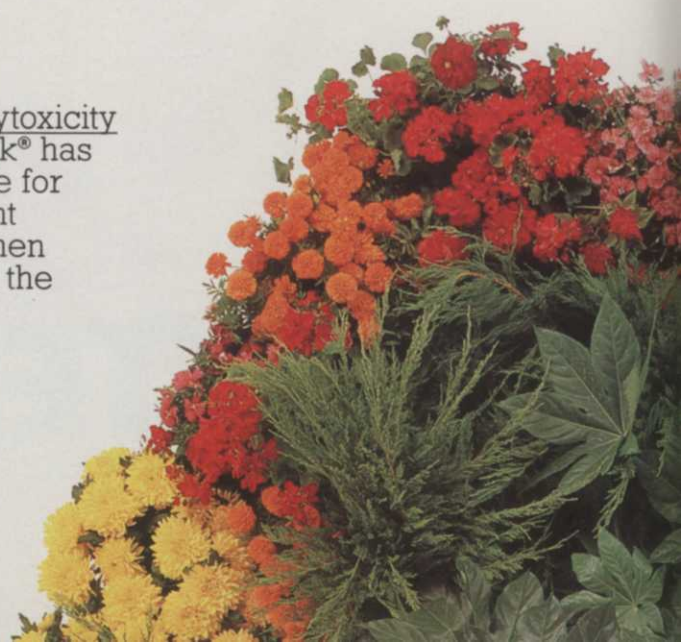

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Circle No. 176 on Reader Inquiry Card

RENOVATION TIME

The silver lining to all those clouds we didn't see last summer is the need for lawn renovations. And that's another way for the astute landscaper to put dollars in the ledger.

Many landscapers did well last fall by making the best of a bad situation: renovating drought-stricken turf.

Many green industry companies have scheduled large numbers of lawn renovations due to the dry turf conditions left in the blistering wake of last summer's drought.

Most renovation work seems to be occuring in the East and Midwest. For the southern and western regions of the country, little rainfall is business as usual, and irrigation systems come into play to provide relief.

"We'll probably be involved in a lot of spring renovations whether we want them or not," says Rick White of ServiceMaster, Downers Grove, Ill. "There's a lot of dead grass out there."

Joseph Kudwa, president and owner of Linden Lawn Care in Michigan, will have completed close to 200 lawn renovations by summer. Portions of Michigan were slammed hard by the drought, receiving .83 inches of rain from May through June. Normal rainfall for that time is six inches, according to Paul Rieke, Ph.D., at Michigan State University. The Lansing area also experienced 37 days above 90°F, well above the average 11 days of above-90 temperatures.

Fulfilling a need

Customers want this service. "They're coming to us requesting something be done, and we simply make suggestions," says Kudwa. Kudwa's company completed about 30 re-dos in the fall, and is expected to do between 100 and 150 this summer.

Rather than prospect extensively, Kudwa distributes flyers among his present customer base, using that base as a more than adequate source of renovation income. "We've got more than we can handle as it is."

Neuvirth Lawn & Landscaping of Omaha did very well by overseeding last fall, when the drought began to taper off. Frank Neuvirth reports that his field personnel encouraged his customers to undergo lawn renovation "because the way things were going, if we didn't re-establish their lawn we wouldn't have any customers this spring."

Neuvirth estimates that 25 to 30 percent of his customers agreed to renovation last year, despite the fact that most have irrigation systems. Total renovation was in the 750,000

square foot range.

Neuvirth says "there is quite a nice profit to be found in renovations." He won't be purchasing new equipment this year. "The amount of time we use renovation equipment compared to its cost doesn't fare too well, especially when you compare it to things like mowers. It just doesn't pay off for us," Neuvirth says. He recommends the new fine fescues to his customers because of their drought tolerance.

Neuvirth's neighbor to the north, Leonard Hernoud of Pro Mow in Lincoln, Neb., agrees that the drought created a nice market for lawn renovations last fall. Hernoud's company did no advertising and still managed to drop about 2,000 pounds of seed last year. He and his customers are getting away from traditional bluegrass mixtures, he says, and are using the hardier, more drought-tolerant tall fescues. "We definitely did a much larger percentage of renovations last year, maybe as much as 75 percent," says Hernoud.

Lied's Nursery of Sussex, Wisc., is having no trouble selling lawn renovations among its customers, according to customer service representative Tim Narr.

"Our plan is to focus on our current market of homeowners, rather than find new customers," Narr notes. "We have the necessary equipment and chemicals, and staff additions aren't necessary." He uses a bluegrass blend/ryegrass mixture which has been in good supply.

Lawn renovations play well in Peoria, Ill. Dean Ramseyer of D.A. Hoerr & Sons says many of his forward-thinking residential and commercial customers also requested renovations in early fall. And the cooperative fall weather gives Ramseyer reason to believe results should be good come spring, but he admits his renovating work is far from over.

Dean Ramseyer of D.A. Hoerr & Sons believes cooperative fall rains could bring good results come spring.

"There's still plenty to be done that should give us a good start on spring, and seeding should go well if the weather is good," he says. Ramseyer adds that Hoerr's may also do some sodding projects if the product is reasonably available.

Though customers indeed want relief from torched lawns, Kudwa thinks the degree of work will greatly depend on what kind of budget people will be willing to set for lawn care after "the discouraging summer of 1988."

Where do you begin?

The degree of renovation required (do you start at square one with Roundup?) obviously depends on the extent of drought stress. As Ramseyer puts it, "You don't need to kill it if it's already dead." Kudwa uses Roundup for coarse fescue problems, goes over the area twice with a slitseeder, then fertilizes.

"We use a fertilizer that will not burn the turf, something with heavy phosphorus and potassium content, like 18-24-12. If the lawn is over-the-hill," says Kudwa, "we explain the circumstances, and recommend slitseeding. One man can slitseed a 10,000 square-foot lawn in half a day."

Ramseyer's crews can slitseed if plant kills are not total, and lots of power raking and overseeding will probably be in order. "But if the lawn is totally devastated, you're best off stripping it off and cultivating a new seed base."

Though Ramseyer, like Kudwa and others, hasn't had to do much promoting of the service, he is making some changes in his approach. He says recent research suggests the winterizing family of fertilizers is perhaps the better way to go for overall root durability and drought tolerance.

"That would be those fertilizers with lower nitrogen/higher phosphorus content. A winterizing product would be in the range of 14 percent nitrogen, 8 to 10 percent phosphorus." In some cases, Ramseyer says, consumers are going to straight winterizer/fertilizer year-long, and not giving the soil extra nitrogen in the spring.

Another trend Ramseyer thinks might be sprouting among two-income families with little time on their hands is that of using a seed mix that allows the homeowner to slack off a bit in watering and fertilizing and still have something decent.

"That might mean a shift into fescues and perennial ryes," he says. "Bluegrass tolerance is also improving, and the consumer might be happier if the mix gives them a more relaxed maintenance schedule."

Compounded problem

Jay Gilfus, vice president/general manager at Arbor Heights Nursery in Webster, N.Y., says Arbor renovated up to 50 lawns last fall, and he expects more requests come spring. Three lawns were total kills, brought about by excessive thatch buildup of up to 1 ½ inches. The thatch acted as an insulator, and the high temperatures "cooked the grass right off its roots.

"In severe thatch cases we had to use a sod cutter to strip the thatch off the lawns, which in some cases can take hours of labor. Then we'd vertislice or power rake, reseed, then

Step one of a lawn renovation often involves the application of Roundup to eliminate all plant material.

make a light pass with the vertiseeder to work in the seed. Finally, a high phosphorus fertilizer is added to aid development."

For cases of "no thatch, but very little grass," Gilfus's crews would vertislice and overseed or use a slicer/seeder or power rake, rake off the loose material and reseed.

A majority of the other cases Gilfus encountered involved maladjusted pH levels of 7 to 8 pH. "We have heavily limestone-based soils in the Rochester area," he explains, "and if the pH is not adjusted downward with sulfur or a sulfur compound, you have weak, shallow-rooted turf. Even if you have the proper fertilizers and nutrients going into the soil, the high pH restricts root and soil exchange capability. Fighting to overcome the difference makes it difficult for grass to be hearty."

Despite the high demand for the renovation service, Gilfus prefers more challenging projects, and only performs renovations as requested. "It's not profitable for us," he says. "It's a labor-intensive, plain vanilla, one-shot deal. Still, we will perform the service to accommodate our customers."

It's "Slitseeding City" at BGT Landscaping in Mundelein, Ill. Jim Biebach says seed is on order, and another slitseeder is on the way to service his commercial and industrial clients.

"There's a lot of dead grass out there," says ServiceMaster's Rick White. He says he'll be doing a lot of lawn renovations this year.

Biebach believes slitseeding is a profitable, cost-efficient service, thanks to new slitseeders on the market. "If you do it well, you can have a standard grass in two weeks," he says.

Seed availability has not been a problem, however Biebach has seen prices go up about 20 percent. "We pass it along to the customer," he says, "but they don't mind because it (the cost) can be justified, and it's cheaper than (installing) sod."

Business is hot!

Many southern and western companies found the drought posed no problems because hot weather was expected. Bret Boland of Lifescapes of Canton, Ga., says the company did circulate more information on manual watering, and did more of that service than usual.

"We also changed our irrigation management program a bit as far as tuning more people in to how their irrigation systems work," he says. "The drought situation brought to light how well we managed irrigation on the site, pointed out irrigation system weaknesses, and gave us an opportunity to to sell hand watering to about five percent of our customers."

Lifescapes has done lots of overseeding, but not total lawn renovations. "Any established fescue in this zone has to be overseeded at least once a year, even without the drought," explains Boland. "The heat down here regularly results in thinning turf."

Messer Landscape of Staunton, Va., doesn't see a big demand for lawn renovation from its commercial or homeowner accounts. Says customer representative Don Esch: "We don't do a lot of lawn reseeding. It's not all that profitable, frankly."

He is recommending his customers go with fine-bladed and turf-type tall fescues. "The fescues did fairly well last year for the most part," says Esch, "but we had problems with Kentucky bluegrass."

Related issues

As an off-shoot of the drought stress, Gilfus says he found grub control to be tougher than usual:

"The grubs burrow deeper to find the moist soil, making it hard to reach them with chemicals."

Jim Biebach of BGT believes the drought of '88 pointed out the need for more professionalism within certain companies seeking a fast buck.

"Too many companies are cutting and running, not pointing out the drought stress problems. I drive by sites all day long," reveals Biebach, "and watch the leaves fall off the trees. Maybe customer budgets don't allow more maintenance."

He admits that sprinkling bans were perhaps a factor depending on location, but he was able to easily sell manual watering. "It was unbelieveable the number of water tankers we had going," Biebach recalls, thanks to the company's private lake. "It's an expensive service, but if you're knowledgeable, you can convince a customer to water manually."

Rain in '89?

Will drought conditions return in 1989? Norton Strommen, chief meteorologist with the World Agricultural Outlook, does not offer any predictions, but he says soil recovery is going well in most of the country.

"The Mississippi Delta up through the Ohio River Valley and the Great Lakes area has had a good moisture recharge," reports Strommen. "And in the West, the cumulative snow pack for the season—which provides the runoff that fills irrigation reservoirs in the spring—is at or above normal."

Of concern is the western Great Plains states, from the Canadian border to down to Texas. which have escaped much winter snow and fall rain.

Strommen adds that history has yet to record two consecutive major droughts, and prospects are for significant improvement. However, the mild winter could lead to greater insect problems in 1989. **LM**

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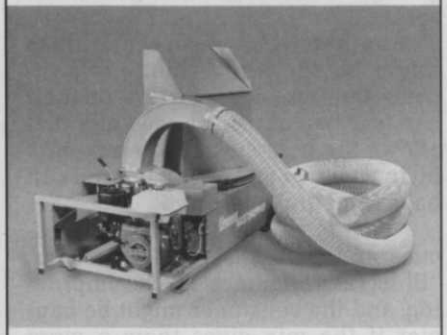

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PLANT GROWTH REGULATOR

Anyone who is involved in mowing and managing low-traffic, irrigated, ornamental turf can benefit from the experiences of those who are using this program.

Everett Mealman, President
PBI/Gordon Corporation

Last year, a number of progressive groundskeepers accepted the challenge to prove to themselves that they could successfully use an Embark-Ferromec AC® program on low-traffic, irrigated turf. We promised them that the program would reduce their bottom-line mowing costs by 50% or more during the 5 to 6-week period while the Embark is active, and in the process would enhance the color and thicken up the turf.

Of course, we knew the program would work because of tests conducted by university researchers, and the experience of Constant Care, Inc., one of the leading landscape management contractors in the entire midwest, who have been pioneering the use of PGRs on ornamental turf since 1985.

But never in our fondest dreams did we anticipate the enthusiam of the positive responses we have received.

Listen to Carl Schroeder, owner of Horticultural Consultants, Inc., of Shawnee Mission, Kansas. He says, "Now that we know what Embark can do, we will be aggressively soliciting mowing and maintenance contracts that we formerly would have shied away from because of questionable profitability."

Schroeder bases his optimism on his experience in testing the Embark-Ferromec AC program on the vast sweep of ornamental turf that surrounds the headquarters of Farmers Insurance Group . . . the largest and most visible piece of turf in the Kansas City area. "It's a tremendous 18.5-acre showcase for us," says Schroeder. "But, is it ever a *#'! to mow!

"There's a 40% slope on some areas that have to be mowed with a walk-behind to avoid ruts and erosion," says Schroeder. "You can imagine the expense! But, with the Embark-Ferromec AC program, we will be able to cut those costs in half, while at the same time improving the appearance . . . and we are hopeful that Embark will help strengthen the roots of the grass on those slopes."

This program is as simple as a, b, c.

First of all, the Embark is applied at the low rate (1 pt./A). The idea is to slow down the growth rather than to totally shut it off.

Second, it is tank-mixed with Ferromec AC Liquid Iron at a high rate (2.75 gal./A), which produces a vibrant green color before the Embark kicks in; hence no worry about discoloration. In fact, just the opposite.

Third, the Embark-Ferromec AC can be tank-mixed with Trimec® Broadleaf Herbicide, so it gets a free ride that even further improves the bottom line.

But wait! There's more good news: Embark is a true plant growth regulator, not a reformulated herbicide. Tests clearly show that when Embark shuts down seedhead development and stem elongation, the energy is redirected toward root growth.

Carl Schroeder, right, gives Everett Mealman a closeup view of the impressive and highly visible turf he maintains for Farmers Insurance Group. Millions of people who whiz by on I-435 see it as a thing of beauty, but Schroeder sees it as a monster for Embark to tame.

Constant Care, Inc. have been pioneering the use of PGRs for five years and were directly involved in the early tests of the Embark-Ferromec AC combination. Bill Gordon, above, director of commercial landscaping for Constant Care, says that nothing works like Embark.

Bill McGee, above right, general manager of Smith Lawn and Tree Company, used Embark/Ferromec AC/Trimec on this turf at Bedford Properties Industrial Park. "Within two days the tall fescue greened up and the mowing was cut in half for six weeks."

Does this look like a challenge for the amateur golfer? Yes, indeed, but it's even more of a challenge for superintendent Jerry Ducker, left, in the photo at right; and his assistant, Tom Addington.

Experience of a golf course superintendent

Jerry Ducker, golf course superintendent of the prestigious Hallbrook Farms Country Club in Leawood, Kansas is extremely interested in the potential problem-solving power of Embark-Ferromec AC.

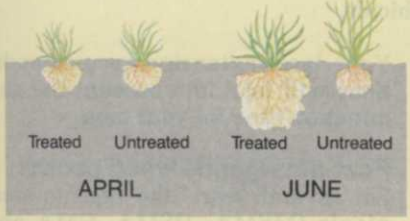
Hallbrook was designed to present a challenge. "And indeed it does!" laughs Ducker . . . "a challenge to the superintendent. For example, we've got zoysia peninsulas that extend into fairway traps that can only be mowed with hand trimmers while standing deep in sand. You can imagine what a labor-intensive job you're looking at."

With this in mind, Ducker tested Embark-Ferromec AC on some of his less-visible areas in 1988. "We're very enthusiastic about what we hope to be able to do with Embark," says Ducker.

Another Embark-Ferromec AC enthusiast is Bill McGee, general manager of Smith Lawn and Tree Company of Kansas City, Missouri. "We used it on three of the Bedford Properties Industrial Parks," says McGee. "And, within 48 hours, the tall fescue took on a rich green color, and the mowings were cut in half for six weeks."

Embark-treated grass develops deeper roots

Research shows that when grass is treated with Embark, the energy that would naturally produce seedheads and stem elongation is redirected to the roots. This phenomenon occurs regardless of whether or not the grass is mowed.



Shouldn't you try Embark?

Indeed, the evidence cannot be denied. The Embark-Ferromec AC-Trimec program is dramatically changing the economics of managing low-traffic, irrigated ornamental turf.

Surely you'll want to keep pace with the change and at least test the program for yourself — if only in a minor way.

If you have any questions at all about using Embark-Ferromec AC, call us toll-tree.

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In Missouri, 1-800-892-7281
Ask for Sales Service.

A $20.00 value for $9 when you buy Embark:

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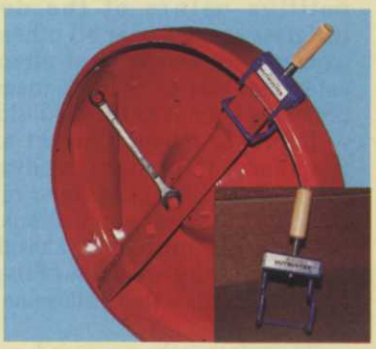

This unique tool clamps to edge of mower deck to secure blade so that nut can be wrenched off quickly and safely. To receive a Nutbuster via UPS, send $9 to PBI/Gordon with your name and address and a copy of an invoice showing you have purchased one quart or more of Embark. Offer expires Nov. 1, 1989. Limit one per customer.

pbi/GORDON CORPORATION
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PLANT GROWTH REGULATOR

717-1288

Circle No. 164 on Reader Inquiry Card

COOL-SEASON WEED CONTROL GUIDE

Good turf management is still the best way to control weeds. But if cool-season weeds appear in your turf, here's how to handle them.

by Thomas L. Watschke, Ph.D., Penn State University

Any successful weed control program begins with cultural practices that favor the competitive nature of the desired turfgrass species over all others. The existence of weeds most often indicates that one or more management practices are not as they should be.

Improper mowing height and/or frequency, improper irrigation (too much or too little), improper rate and timing of fertilizer applications, compaction, pH problems, thatch and chemical injury are a few of the management factors that influence weed invasion.

Therefore, when a weed problem is identified, the proper course of action is to determine why a void existed in the turf allowing the unwanted plant to encroach in the first place. Once the reason for encroachment has been found, appropriate changes in cultural practices must be taken before and/or in combination with the proper selection and use of a herbicide.

Most weeds cannot be completely controlled with cultural practices, but herbicide activity can be greatly enhanced when the turf is managed to be as competitive as possible.

Too often, when a weed problem is identified, the first course of action is to find out what chemical is recommended for control. As a result, the reason for the void in the turf is not considered as part of the overall weed control strategy. Generally, such a weed control program utilizes more herbicides than necessary and is not as successful as it should be.

From a chemical standpoint, pre-emergence herbicides work best on annual grassy weeds and some annual broadleaf species. Currently, benefin, benefin + trifluralin, bensulide, Dacthal, pendimethalin, oxadiazon and siduron are the primary pre-emergence herbicides labelled for use on cool-season turf.

Crabgrass, a bunch type grassy weed, can be controlled with a properly timed application of pre-emergent herbicide.

As these products are absorbed from the chemical barrier that is formed as they are dissolved in water, they suppress the emergence of germinating plants. Therefore, it is imperative that pre-emergence herbicides be applied seven to 10 days prior to expected emergence. If rainfall does not occur within two to three days, irrigation should be applied. Your local extension recommendations will take into account the germination time for your area.

Post-emergence weed control

For several years, the organic arsenicals (MSMA, DSMA, CMA and MAMA) were the primary herbicides used for the post-emergence control of summer annual grassy weeds. These materials continue to be used successfully, particularly when applied sequentially (two to three applications).

Control is rarely equivalent to that attained using pre-emergence herbicides. And, in some cases, desired

species can be injured during hot weather. Always be sure to be completely familiar with the label of any pesticide before you use it.

Recently, a new post-emergence material has been labelled for use and has provided excellent annual grassy weed control in many instances. With proper timing, one application can provide control equivalent to the best pre-emergence material. This product (Acclaim) has less potential for injury than the arsonates, but has been found to injure some varities of Kentucky bluegrass when applications are made prior to mid-June. Turf treated with Acclaim should not be mowed for a day or two and should never be treated if under moisture stress.

Broadleaf weed control

The vast majority of broadleaf weeds, regardless of life cycle, are controlled by 2,4-D, MCPP, dicamba or tri-

The best control of new broadleaf seedlings can be attained with bromoxynil.

chlopyr and combinations thereof. Most of the time, amine formulations are used and provide safe and excellent control. On occasion, ester formulations are used for more difficult-to-control species like oxalis, wild garlic and others.

Although excellent results can be attained using ester forms, care should be taken that they not be used during hot weather. When temperatures are predicted to be in the 80s, do not use esters as they can damage non-target species due to volatility.

On new seedings, the best control of broadleaf seedlings can be attained with bromoxynil, while risk to the seedling grass is minimal.

Before using other broadleaf herbicides, be sure that the turf has been mowed a minimum of three times. For best control, broadleaf weeds should be actively growing and not under moisture stress. Too often, broadleaf weeds are sprayed during hot and dry conditions and the resulting control is less than it should be.

The risk of injuring the desired turfgrass is also greater during hot and dry conditions. Broadleaf weeds vary greatly in their susceptibility to herbicidal action. For some species, ex-

HERBICIDE Guide DIRECTORY

COOL-SEASON HERBICIDES

Herbicide	Brand Name(s)	Company	Uses
ammonium sulphanate	Ammate	DuPont	Non-selective rights of way herbicide
asulam	Asulox	Rhone Poulenc	Postemergence grassy weed control for turf and ornamentals
atrazine	Aatrex	Ciba Geigy	Non-selective control in non-crop areas.
benefin	Balan	Elanco	Preemergence control of annual grasses and broadleaf weeds in established turf.
bensulide	Betasan Pre-San Lescosan Betamec-4	ICI Sierra Lesco PBI Gordon	Preemergence control of annual grasses and broadleaf weeds in established turf and established flower gardens. Safe near tulip and daffodil bulbs.
bentazon	Basagran	BASF	Selective postemergence control of nutsedge in warm-season turf.
bromacil	Hyvar	DuPont	Nonselective control of weeds and grasses in non-crop areas. Usually mixed with diuron for roadsides and rights-of-way.
bromoxynil	Buctril	Rhone Poulenc	Postemergence control of broadleaf weeds in seedling turf, established turf and non-crop areas.
cacodylic acid	Phytar Rad-E-Cate	Vertac Vineland	Nonselective control for turf renovation, edging and in plant beds.
chloramben	Amiben	Rhone Poulenc	Preemergence control in ornamentals.
chlorflurenol	Maintain	Uniroyal	Growth regulator. Also controls broadleaf weeds and vines.
copper	Cutrine-Plus	Applied Biochemists	Control algae, chara and hydrilla in potable water.
dalapon	Dalapon 85 Dowpon M	Fermenta Dow	Selective control of perennial and annual grasses in non-crop areas and ditchbanks.
dazomet	Mylone	Hopkins Ag.	Preplant sterilant for turf and ornamental beds.
DCPA	Dacthal	Fermenta	Preemergence control of annual grasses and broadleaf weeds in turf and ornamental beds.

HERBICIDE DIRECTORY

COOL-SEASON HERBICIDES

Herbicide	Brand Name(s)	Company	Uses
dicamba	Banvel	Sandoz	Selective postemergence control of broadleaf weeds in turf and for noncrop control of brush.
dichlobenil	Dyclomec	PBI Gordon	Selective weed control in ornamental beds and for total weed control on roadsides, fencerows, etc.
dichlorprop	2,4-DP	Rhone Poulenc	Brush control and aquatic weed control.
diphenamid	Enide	Nor-Am, Upjohn	Selective control of annual grasses and broadleaf weeds in bermudagrass, dichondra and around ornamenta.s
DSMA	Methar 30 DSMA Liquid DSMA 81% Weed-E-Rad	W.A. Cleary Drexel Vertac Vineland	Selective postemergence control of sedges and grasses in turf and ditchbanks and storage yard.
diquat	Diquat	Valent	Aquatic weed control.
diuron	Karmex Dynex Diuron 80WP Urox	DuPont Vertac Drexel Hopkins	Generally used at high rates for nonselective total weed control in industrial sites.
endothall	Aquathol K Endothall	Pennwalt Pennwalt	Aquatic weed control and turf herbicide and dessicant.
EPTC	Eptam	ICI	Selective control of annual grassy weeds, nutgrass, and perennial weeds.
ethofumesate	Prograss	Nor-Am	For control of Poa annua and white clover in fairways.
fosamine	Kernite	DuPont	Brush control.
flurprimidol	Cutless	Elanco	Growth regulator that suppresses annual bluegrass.
fluazifop-butyl	Fusilade	ICI Americas	Selective postemergence control of grassy weeds in ornamentals.
fluridone	Sonar	Elanco	Broad spectrum herbicide for submersed and emersed aquatic weeds.

BROADLEAF WEEDS POST-EMERGENCE HERBICIDE COMBINATIONS

- ☐ TRIMEC
- ☐ TREXSAN
- ☐ SUPER TRIMEC
- ☐ TURFLON
- ☐ WEEDONE DPC

cellent control can result from a single application. However, it is more common that most broadleaf weeds require two applications spaced a few weeks apart. The more difficult-to-control species are rarely ever completely controlled, but the level of infestation can be greatly reduced.

Total control

The severe weather in much of the country during the summer of 1988 caused substantial turf loss in some locations. Consequently, more renovation activity existed than in most years.

Glyphosate (Roundup) is the most commonly-used total vegetation control product on the market. It provides excellent control of most unwanted

PRE-EMERGENCE HERBICIDES WITH SOIL LONGEVITY:

- ☐ BENEFIN
- ☐ DCPA
- ☐ OXADIAZON
- ☐ PENDIMETHALIN
- ☐ BENSULIDE

Nimblewill is characterized by clumps of dark blue-green leaves during the summer. Regrowth starts at the nodes of the stems in spring.

vegetation, is deactivated by the soil within a few days, and is translocated within treated plants, allowing for the control of more stubborn perennial grasses.

Overseeding can be accomplished within a matter of days after Roundup treatment. In many instances, the treated site is verticut in several directions (perhaps in conjunction with aerification) and overseeded in a broadcast manner. If vegetatively-spreading perennial grasses (creeping bentgrass, quackgrass and nimblewill) are present in the stand to be

HERBICIDE DIRECTORY

COOL-SEASON HERBICIDES

Herbicide	Brand Name(s)	Company	Uses
glyphosate	Rodeo	Monsanto	For control of emerged aquatic weeds and broad leaf weeds in or near aquatic sites, such as ditchbanks.
glyphosate	Roundup	Monsanto	Nonselective, short-term herbicide for turf renovation and total weed control along fences and plant beds.
imazaquin	Image	American Cyanamid	Experimental herbicide for turf
imazapyr	Arsenal	American Cyanamid	Broad spectrum systemic industrial herbicide
linuron	Lorox	DuPont	Short-term control of annual weeds in roadsides and fence rows.
mefluidide	Embark	PBI Gordon	Growth regulator that suppresses Poa annua.
metham	Vapam	ICI	Preplant soil fumigant killing weeds, weed seed, insects and fungi.
methyl bromide	Dowfume	Dow	Fumigant for pre-plant control. Also kills weed seed.
metribuzin	Sencor	Mobay	Postemergence control of goosegrass in warm-season turf.
MCPP	MCPP Mecomec MCPP Chipco Turf Herbicide	Fermenta PBI Gordon WA Cleary Rhone Poulenc	Selective broadleaf weed control in turf. Often combined with other herbicides.
MSMA	Daconatel Broadside Ansar Weed-Hoe	Fermenta Vertac Drexel Vineland	Postemergence selective control of crabgrass and broadleaf weeds in turf. Also, grassy weed control in ditchbanks, roadsides, industrial areas.
napropamide	Devrinol	ICI	Selective control of weeds in ornamental beds and containers. Experimental combination with Betasan for season-long crabgrass control in turf.
oryzalin	Surflan	Elanco	Preemergence control of weeds in established ornamentals and warm-season turf.
oxadiazon	Ronstar	Rhone Poulenc	Preemergence control of weeds in ornamentals and turf.

HERBICIDE DIRECTORY

HERBICIDES OF COOL-SEASON GRASSES

oxyfluorfen	Goal	Rohm & Haas	Selective control of weeds in ornamentals.
paraquat	Paraquat	Valent	Nonselective control of weeds in rights-of-way, industrial areas and fencerows.
pendimethalin	Proturf Weedgrass Control Pre-M	Lesco	Preemergence turf herbicide for control of grassy and broadleaf weeds.
picloram	Tordon	Dow	Systemic, long-term killer of woody plants and broadleaf weeds.
prometon	Pramitol	Ciba Geigy	Nonselective herbicide with long residual for industrial weed control.
pronamide	Kerb	Rohm & Haas	Poa annua control in warm season grasses. Also weed and grass control around woody ornamentals and Christmas trees.
sethoxydim	Poast	BASF	Postemergence control of grassy weeds around broadleaf ornamentals.
siduron	Tupersan	DuPont	Preemergence control of annual grasses in newly seeded turf areas.
simizine	Princep	Ciba Geigy	Selective control of annual grasses and broadleaf weeds in established bermudagrass. Also, used in industrial and aquatic weed control.
sulfometuron-methyl	Oust	DuPont	Non-selective industrial and selective in bermudagrass.
tebuthiuron	Spike	Elanco	Brush control and total vegetation control in non-crop areas.
trifluralin	Treflan	Elanco	Selective preemergence weed control in established ornamentals and under asphalt.
triclopyr	Garlon	Dow	Systemic control of woody plants in rights-of-way and industrial sites.
2,4-D	2,4-D	Dow Fermenta Rhone Poulenc Vertac	Selective control of weeds in turf and numerous other areas. Usually mixed with other herbicides.
Vorlex	Vorlex	Nor-Am	Preplant fumigant. Broadleaf weed control in established turf.

SOURCE: Dr. Tom Watschke

renovated, do not verticut for at least 10 days after treatment to allow for a more complete translocation of the Roundup into the vegetative organelles.

In some circumstances, a turf manager may have the need to fumigate a seedbed prior to planting. Seed of certain unwanted species may be known to exist in the site or insect and/or disease problems may require fumigation for control. Most commonly, methyl bromide is used for fumigation. It is extremely toxic and would require application by a licensed applicator.

For best control, broadleaf weeds should be actively growing and not under moisture stress. Too often, broadleaf weeds are sprayed during hot and dry conditions and the resulting control is less than it should be.

For large areas, fumigation is best accomplished by commercial applicators who have the right equipment and can perform the task efficiently and safely.

Poa annua control

Most turf managers desiring to control *Poa annua* use one of two methods. If the desired species is perennial ryegrass, then the best course of action is to use ethofumesate (Prograss). This product has provided spectacular control in mixed *Poa annua*/turf-type perennial ryegrass stands.

When *Poa annua* is unwanted in combination with creeping bentgrass, the most successful course of action has been to use paclobutrazol (Scott's TGR). Spring and fall applications of this product have resulted in dramatic increases in creeping bentgrass populations over as little as a two-year period.

Poa annua is discolored by such treatment, but the discoloration is not long lasting, and as the amount of creeping bentgrass increases, the amount of discoloration on site decreases. **LM**

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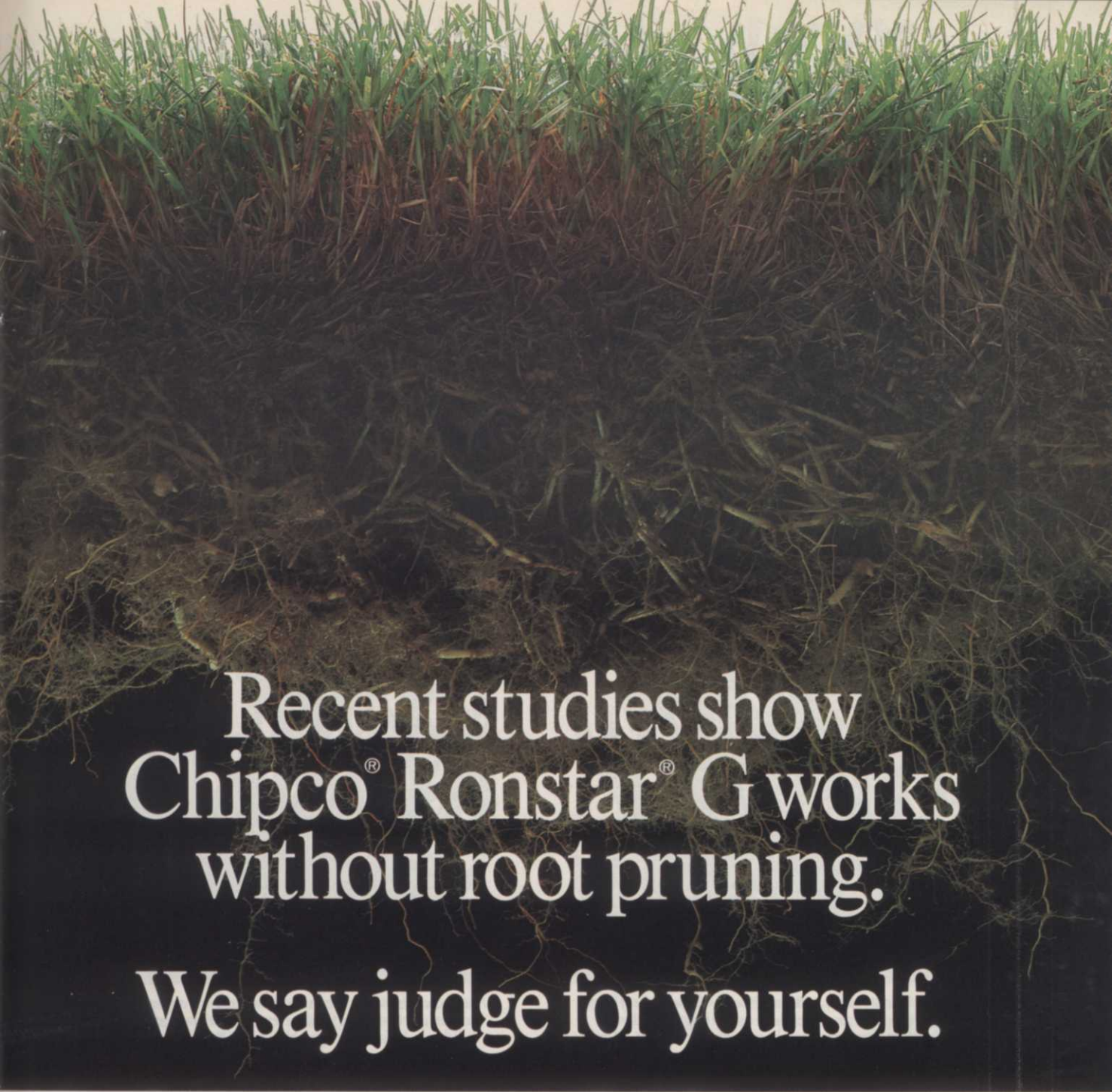
HERBICIDE COMBINATIONS

Herbicide	Brand Name(s)	Company	Uses
2, 4-D plus MCPP	Chipco Turf Kleen Cleary Scotts II SDS Tee Time Lescopar	Rhone Poulenc WA Cleary OM Scott Fermenta Andersons Lesco	Broadleaf weed control in established turf.
2, 4-D plus dicamba	Scotts I Banvel Plus Lesco Selective Herbicide	OM Scott Sandoz Lesco	Selective postemergence control of weeds in turf.
2, 4-D plus MCPP plus dicamba	Three-way Trimec Trexan	Lesco PBI Gordon Sierra	Selective, broad spectrum control of weeds in turf.
2, 4-D plus MCPP plus dicamba plus MSMA	Trimec plus	PBI Gordon	Broad spectrum postemergence control of broadleaf weeds and annual grasses.
2, 4-D plus dichlorprop	Weedone DPC	Rhone Poulenc	Selective postemergence control of weeds in turf.
2, 4-D plus dichlorprop	Weedone DPC Amine	Rhone Poulenc	Broad-spectrum, selective, postemergence control of weeds in turf.
2, 4-D plus dicamba plus dalapon	Banvel Plus	Sandoz	Broad spectrum, post-emergence turf weed control.
2, 4-D plus prometon	Vegemec	PBI Gordon	Selective postemergence control of weeds in turf.
2, 4-D plus triclopyr	Turflon-D	Dow Chemical	Selective postemergence turf herbicide for broadleaf weeds.
Balan plus Ronstar	Regalstar	Regal Chem.	Broad spectrum pre-emergence control of weeds in turf.
amitrol plus simazine	Amizine	Rhone Poulenc	Season-long control of weeds and grasses.
MSMA plus cacodylic acid	Broadside	Crystal	Nonselective, broad spectrum weed control.
diuron plus sodium chlorate plus sodium metaborate	Chlorea	Rhone Poulenc	Nonselective weed and grass killer.
benefin plus oryzalin benefin plus trifluralin	XL Team	Elanco	Preemergence control of annual grasses and broadleaf weeds in established turf.
bensulide plus oxadiazon	ProTurf Goosegrass/ Crabgrass Control	OM Scott	Broad-spectrum pre-emergence control of annual grasses.
bromacil plus diuron	Rout Krovar	Hopkins DuPont	Wide range control of weeds in industrial sites and rights-of way.
MSMA plus dicamba	Mondak	Sandoz	Noncropland general weed control.
prometon, simazine anc chlorate	Pramitol	Ciba Geigy	Full-season weed control in industrial sites.
tebuthiuron plus trifluralin	Spike Treflan	Elanco	Non-selective, season-long, preemergence and postemergence control of weeds industrial and non-cropland areas.

SOURCE: Dr. Watschke

Note: These tables represent a partial list of available herbicides



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So judge for yourself. You'll discover why CHIPCO® RONSTAR® is the number one turf herbicide on the course today.

Chipco® Ronstar® G
Brand Herbicide

RHÔNE-POULENC

As with any crop protection chemical, always read and follow instructions on the label. CHIPCO and RONSTAR are registered trademarks of Rhone-Poulenc. © 1988 Rhone-Poulenc Ag Company

Circle No. 174 on Reader Inquiry Card

Dollar Spot first appears as yellow-green blotches on grass blades. Overall view of affected area shows patches from a few inches to several feet in diameter. Treat preventively at a rate of 1 oz./1,000 sq.ft. every 28 days.

Summer Patch first appears as small patches of light green turf but can fade within hours to a light straw color. Research indicates best results are obtained with a preventive application of 4 oz. when soil temperature reaches 60-70°, followed by a second application 30 days later.

Red Thread, in its latter stages, is distinguished by the presence of bright coral pink thread-like structures 1/16-1/4 inch in length. Use Banner preventively, before disease problems begin, with 2 oz. every 14-21 days.

Anthracnose is most severe on Poa annua and first appears as irregular patches of yellowing turf which eventually turn bronze before fading to light tan. Prevent damage with 1-2 oz. of Banner every 14-28 days.

The first preventive fungicide that lets

For years, medical science has known that to achieve the most effective control, different diseases often require differing methods of prescriptive treatment.

Yet only now, with Banner,® are you finally able to gain the same sophistication in the prevention of diseases on turf.

Because Banner is a truly unique systemic fungicide. With a broader spectrum of control and a more efficient method of treatment than any other yet devised.

Instead of one indiscrim-

Powdery Mildew gets its name from the early stage growth of a gray-white powdery fungus on the leaf surface. In cases of high incidence, entire turf areas may appear dull white. Prevent fungus growth with 1-2 oz. every 14-28 days.

Rust shows up first as light yellow flecks on the grass leaves. If left untreated, leaf surface will eventually rupture and yellow-orange or reddish-brown pustules develop. Preventive treatment calls for 1-2 oz. every 14-28 days.

Spring Dead Spot appears as circular, straw-colored patches on Bermudagrass leaves just as they begin to green-up in spring. The rest of the plant is affected with black to brown dry rot. University research indicates preventive control can be obtained with 4 oz. applied in the fall.*

Brown Patch is recognized by a "frog-eye" pattern formed by the diseased turf encircling green, unaffected plants. For prevention, apply 2-4 oz. every 10-21 days. If disease is already present, apply 2 oz. with a registered contact fungicide.

you treat each disease on its own turf.

inate rate, Banner gives you the precision to treat up to a total of twelve specific turf diseases with their own recommended rates, timing, and frequencies.

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Circle No. 112 on Reader Inquiry Card

WARM-SEASON WEED CONTROL GUIDE

Controlling warm season weeds requires a one-two punch: vigorous turf and proper herbicide use.

by Tim R. Murphy, Extension Agronomist, University of Georgia

They don't fly or lay eggs, but weeds are probably considered by most landscape managers the major pest in warm-season turfgrasses.

For a vigorous, high quality weed-free turfgrass, you need a two-phase weed management strategy.

The first phase involves the use of cultural practices and insect and disease control programs that promote a dense, vigorous turf cover.

Weeds are opportunistic and easily infest bare or thin turfgrass areas. Keeping to approved cultural practices for fertility, watering, cultivation and mowing will promote vigorous turfgrass growth. It will also help prevent weed infestations. Insect and disease control programs should be continually monitored throughout the year.

TABLE 1

WARM-SEASON TURFGRASS TOLERANCE TO PRE-EMERGENCE HERBICIDES.

	TURFGRASSES				
Herbicide	**Bahia-grass**	**Bermuda-grass**	**Centipede-grass**	**St. Augustine-grass**	**Zoysia grass**
(PRE-EMERGENCE)					
atrazine[1]	NR	T(D)	T	T	I
benefin	T	T	T	T	T
benefin + oryzalin	T	T	T	T	T
benefin + trifluralin	T	T	T	T	T
bensulide	T	T	T	T	T
bensulide + oxadiazon	NR	T	NR	NR	T
DCPA	T	T	T	T	T
ethofumesate[2]	NR	T(D)	NR	NR	NR
fenarimol	—	T	—	—	—
napropamide	T	T	T	T	NR
oryzalin	T	T	T	T	T
oxadiazon	NR	T	NR	T	T
pendimethalin	T	T	T	T	T
pronamide	NR	T	NR	NR	NR
simazine	NR	T	T	T	T

[1]When dormant, bermudagrass and zoysiagrass have good tolerance to atrazine.
[2]Ethofumesate is labeled for use on dormant bermudagrass that is overseeded with perennial ryegrass.
T = Tolerant at labeled rates; I = Intermediate tolerance, NR = Not registered for use on this turfgrass.

SOURCE: DR. MURPHY

Using herbicides

The second phase of the weed management strategy involves using herbicides.

When used in combination with approved cultural practices and insect and disease control programs, herbicides can help prevent weeds. However, strict reliance on herbicides without regard for other management practices will not result in a high quality, aesthetically appealing turfgrass.

The herbicides used in warm-season turfgrasses are classified as either pre-emergence or post-emergence chemicals. Pre-emergence herbicides form the foundation of the chemical weed control program. They are primarily used for the control of annual grasses such as crabgrass, goosegrass and annual bluegrass. Post-emergence herbicides are generally used to control problem weeds, such as nutsedge, dallisgrass and wild garlic onions, that are not controlled by pre-emergence herbicides.

When pre-emergence weed control fails, post-emergence herbicides provide a valuable option for controlling emerged weeds. A complete chemical weed control program can be accomplished in most warm-season turfgrasses with post-emergence herbicides if multiple applications are used. But because repeat applications can cause temporary turfgrass injury, most landscape managers prefer to use post-emergence herbicides in conjunction with a pre-emergence weed control program.

Pre-emergence herbicides are applied to the turfgrass site prior to weed seed germination. This group of herbicides controls weeds during the weed seed germination process. Pre-emergence herbicides do not affect the viability of dormant weed seeds. Weeds that have emerged at the time of application will not be controlled by most pre-emergence herbicides.

Going both ways

Although most herbicides may be classified as pre-emergence or post-emergence, atrazine (Aatrex, Purge), simazine (Princep) and pronamide (Kerb) are exceptions. These herbicides have pre-emergence and post-emergence activity on a wide variety of winter annual weeds.

Pre-emergence herbicides are applied in the spring for crabgrass and goosegrass control and in the fall months primarily for annual bluegrass control. They must be applied before weed seed germination.

Late February to early March applications generally provide better crabgrass control than later applications. However, in the cooler, mountainous regions of the South, the spring application may be delayed until late March or early April. For annual bluegrass, late August to early October applications are used, depending on geographical location.

Pre-emergence herbicides need rainfall or irrigation water to move them into the zone of maximum weed seed germination. Recommendations vary slightly among different pre-emergence herbicides, but unless one-fourth to one-half inch of rainfall occurs within seven days, the herbicide should be irrigated into the top two inches of the soil profile.

A thick thatch layer decreases the persistence of pre-emergence herbicides. Elimination of heavy thatch by cultivation (aerification, verticutting, topdressing) increases herbicide contact with the soil and helps prevent accelerated breakdown of the herbicide in the thatch layer.

Cultivation has not been generally recommended or performed *after* a pre-emergence herbicide application. Cultivation was believed to disrupt the herbicide barrier in the soil and stimulate weed emergence.

A recent study conducted in Georgia investigated the effect of core aeration prior to and after pre-emergence herbicides had been applied to common Bermudagrass. Coring at the time of application or up to four months after pre-emergence herbicide application did not decrease large crabgrass control for five pre-emergence herbicides that were evaluated.

In a related study, coring up to three months following an application of oxadiazon (Ronstar) to a Bermudagrass putting green did not affect goosegrass control. Data are not available for other weed species; however, it appears that core aeration does not influence the normal level of weed control of pre-emergence herbicides.

Vertical mowing

A study conducted in Michigan on annual bluegrass showed that a light vertical mowing did not decrease large crabgrass control for three different pre-emergence herbicides. The effects of vertical mowing on the efficacy of pre-emergence herbicides has not been investigated on Southern turfgrasses. Using vertical mowing to remove thatch may possibly affect the effectiveness of pre-emergence herbicides under Southern environmental conditions.

Established warm-season turfgrasses have excellent tolerance to labeled pre-emergence herbicides (see table 1). Newly-seeded and sprigged turfgrasses have a low level of tolerance and can be severely injured by most pre-emergence herbicides.

On immature turfgrasses, pre-

HERBICIDE DIRECTORY

COMMON AND TRADE NAMES OF WARM-SEASON TURFGRASS HERBICIDES.

Common Name	Company	Trade Name and Formulation[1]
DCPA	Fermenta	Dacthal 75W
dicamba	Sandoz PBI/Gordon	Banvel 4 lbs./gal. Dicamba 4, 4 lbs./gal.
DSMA	Interag, Vineland, Others	Numerous trade names and formulations are available.
ethofumesate	Nor-Am	Prograss 1.5EC
fenarimol	Elanco	Rubigan 50W, 1AS
glyphosate	Monsanto	Roundup 4 lbs./gal.
imazaquin	Lesco	Image 1.5 lbs./gal.
MCPA	PBI/Gordon	MCPA 4 lbs./gal.
MCPA + MCPP	Riverdale	Weedestroy Triamine II
+ dichlorprop MCPP	Royalgard Rhone-Poulenc PBI/Gordon Lesco	Sabre Turf Herbicide MCPP 2 lbs./gal. Mecomec 4 4 lbs./gal. Lescopex 2.5 lbs./gal.
MCPP + 2,4-D + dicamba	PBI/Gordon	Trimec Southern
metribuzin MSMA	Mobay Fermenta, Platte, Others	Sencor Turf 75W Numerous trade names and formulations are available.
napropamide	Lesco ICI	Devrinol 5-G Ornamental Devrinol 50WP, 5G
oryzalin	Elanco	Surflan 4AS
oxadiazon	Rhone-Poulenc	Ronstar 2G
pendimethalin	Lesco Scotts	PRE-M 60DG Southern Weedgrass Control 2.45G, Turf Weedgrass Control 1.71G, Weedgrass Control 60DG
pronamide	Rohm-Haas	Kerb 50W
sethoxydim	BASF	Poast 1.5 lbs./gal.
simazine	Ciba-Geigy	Princep 80W, 4L, 90DG, 4G

emergence herbicide applications should be delayed until the soil is completely covered.

Pre-emergence herbicides persist in the soil for two to four months, advantageous in terms of length of weed control. However, these herbicides may cause establishment problems if seeding, sprigging, or sodding is planned for a particular site.

The herbicide label should be consulted to determine the length of time needed before renovation operations can be safely conducted.

New pre-emergents

Three pre-emergence herbicides are in the final stages of development and evaluation by chemical companies and universities:

- Monsanto Company is investigating MON 15100 (Dimension) for annual grass and broadleaf weed control in both cool- and warm-season turfgrasses.
- Isoxaben (Gallery) is being evaluated by the Elanco Products Co. for wide spectrum broadleaf weed control and is expected to be on the market in 1989.
- Prodiamine (Sentinel) is a dinitroaniline herbicide being evaluated by the Sandoz Crop Protection Corp. for annual grass and broadleaf weed control in all major turfgrasses.

Post-emergents

Post-emergence herbicides are applied directly to the foliage of emerged weeds. In contrast to pre-emergence herbicides, this group of

See Guide on page 58

TABLE 2

WARM-SEASON TURFGRASS TOLERANCE TO POST-EMERGENCE HERBICIDES.

	TURFGRASSES				
Herbicides	**Bahia-grass**	**Bermuda-grass**	**Centipede-grass**	**St. Augustine-grass**	**Zoysia-grass**
(POSTEMERGENCE)					
asulam	NR-S	T[1]	NR-S	T	NR-I
atrazine	NR-I	T(D)	T(D)	T	I
bentazon	T	T	T	T	T
bromoxynil	T	T	T	T	T
2,4-D	T	T	S-I	S-I	T
2,4-D + dicamba	T	T	S-I	S-I	T
2,4-D + dichlorprop	T	T	S-I	S-I	T
2,4-D + mecoprop	T	T	S-I	S-I	T
2,4-D + mecoprop + dicamba	T	T	S-I	S-I	T
2,4-D + mecoprop + dichlorprop	T	T	I	I	T
dicamba	T	T	I-T	S-I	T
DSMA, MSMA	S	T	S	S	I
glyphosate[2]	NR-S	T(D)	NR-S	NR-S	NR-S
imazaquin	—	T	T	T	T
MCPA + MCPP + dichlorprop	T	T	I	I	T
MCPP + 2,4-D + dicamba	T	T	I	I	T
MCPP	T	T	S-I	S-I	T
metribuzin	NR-S	T	NR-S	NR-S	NR-S
pronamide	NR	T	NR	NR	NR
sethoxydim	NR-S	NR-S	T	NR-S	NR-I

[1] Asulam is labeled for use only on 'Tifway' (419) bermudagrass.
[2] Bermudagrass is tolerant to glyphosate when completely dormant.
T = Tolerant at labeled rates; I = Intermediate tolerance, use at reduced rates; S = Sensitive, do not use this herbicide; NR = Not registered for use on this turfgrass.

Control of annual grass

Crabgrass (large, smooth, Southern) and goosegrass are common summer annual weeds in warm-season turfgrasses. With the exception of atrazine, simazine and pronamide, spring applications of pre-emergence herbicides will provide good to excellent control of crabgrass (see table 3). Goosegrass tends to germinate later in the spring than crabgrass and is more difficult to control. Single applications of oxadiazon and bensulide + oxadiazon (goosegrass/crabgrass control) have provided high levels of goose-

See Grass on page 58

TABLE 3

ANNUAL GRASS CONTROL RATINGS FOR PRE-EMERGENCE HERBICIDES.

Herbicide	Crabgrass spp.	Goosegrass	Annual bluegrass
atrazine	P	P	E
benefin	E	F	E
benefin + oryzalin	E	F-G	E
benefin + trifluralin	E	F	E
bensulide	E	P	P
bensulide + oxadiazon	E	G	—
DCPA	E	F	G
napropamide	E	G	G
oryzalin	E	F-G	E
oxadiazon	G	E	G
pendimethalin	E	F-G	E
pronamide	F	P	E
simazine	F	P	E

E = Excellent, ≥ 90% control.
G = Good, 80 to 89% control.
F = Fair, 70 to 79% control.
P = Poor, < 70% control.

SOURCE: DR. MURPHY

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Control of problem weeds with post-emergents

Many problem weeds can be controlled with selected post-emergence herbicides. Bentazon (Basagran) will control **yellow nutsedge**, but won't kill **purple nutsedge**. Monthly applications of MSMA or DSMA in tolerant turfgrasses will suppress the growth of both nutsedge species. Imazaquin (Image) has provided good control of purple nutsedge in tests conducted in Mississippi and Georgia. In tolerant turfgrasses (Meyer zoysiagrass, Bermudagrass), the addition of MSMA to imazaquin increases purple nutsedge control.

Wild garlic can be controlled with winter applications of 2,4-D or two-way and three-way herbicide mixtures that contain 2,4-D or dicamba. Late fall applications of imazaquin may also be used.

Virginia buttonweed is an extremely difficult weed to control in warm-season turfgrasses. Research conducted in Mississippi showed that 2,4-D + dichlorprop (Weedone DPC) is more effective for Virginia buttonweed control than other two-way and three-way broadleaf herbicide mixtures.

Dallisgrass and **bahiagrass** can be controlled in tolerant turfgrasses with MSMA and DSMA. Usually two to three applications, each at an interval of 5 to 10 days, is needed to control these weeds. In centipedegrass, two applications of sethoxydim at an interval of 10 to 14 days suppresses bahiagrass but not dallisgrass growth. Asulam (Asulox) will provide fair control of bahiagrass in St. Augustinegrass.

—Tim Murphy □

herbicides has no or only minimal soil residual activity. Certain post-emergence herbicides may be used at low rates on newly-established warm-season turfgrasses.

A general rule is to delay the application until sprigs have rooted and are actively growing, or until the turfgrass has been mowed three to four times. Delaying the application allows time for the sprigs or seedlings to become established. It also improves their tolerance to post-emergence herbicides.

Post-emergence herbicides may be used at various times during the year. Applications to weeds that are actively growing and not under drought and/or temperature stress will result in better control. Target the application to coincide with air temperatures

Guide *from page 56*

grass control in experiments conducted in Georgia.

Split applications, each at an interval of 8 to 10 weeks, of benefin + oryzlin (XL), benefin + trifluralin (Team), oryzalin (Surflan), pendimethalin (various trade names) and napropamide (Devrinol) will also provide acceptable (>80%) control of goosegrass. With the exception of bensulide, the pre-emergence herbicides used in warm-season turfgrasses will control annual bluegrass.

—Tim Murphy □

HERBICIDE DIRECTORY

COMMON AND TRADE NAMES OF WARM-SEASON TURFGRASS HERBICIDES.

Common Name	Company	Trade Name and Formulation[1]
asulam	Rhone-Poulenc	Asulox 3.34 lbs./gal.
atrazine	Royalgard Ciba-Geigy	Purge 4 lbs./gal. Aatrex 4L, 90DG, 80W
benefin	Elanco Lesco	Balan 2.5G, 85DG 2.5 Benefin Granular (2.5G)
benefin + oryzalin	Elanco	XL 2G
benefin + trifluralin	Elanco	Team 2G
bensulide	ICI Royalgard PBI/Gordon Lesco	Betasan 2.9E, 4E, 3.6G, 7G, 12.5G Roysan 4E, 12.5G Betamec 4LF Lescosan 4E, 7G
bensulide + oxadiazon	Scotts	Goosegrass/Crabgrass Control 6.5G
bentazon	BASF	Basagran - 4lbs./gal.
bromoxynil	Rhone-Poulenc Lesco	Buctril 2 lbs./gal., Buctril 4EC, Brominal 2 lbs./gal., ME4 Brominal Brominal 2 lbs./gal.
2,4-D	Interag, Lesco, Fermenta Others	Numerous trade names and formulations are available
2,4-D + dicamba	Rhone-Poulenc Lesco PBI/Gordon	Weedone Super D Pro Amine Eight-One Selective Herbicide Phenaban 801
2,4-D + dichlorprop	Rhone-Poulenc	Weedone DPC Amine, Weedone DPC
2,4-D + mecoprop	Lesco Rhone Poulenc PBI/Gordon	Lescopar Turf Kleen Phenomec 2+1
2,4-D + mecoprop + dicamba	Lesco	Three-way
2,4-D + mecoprop + dichlorprop	Riverdale	Weedestroy Triamine

[1]Numeral refers to percent or pounds of active ingredient.

SOURCE: DR. MURPHY

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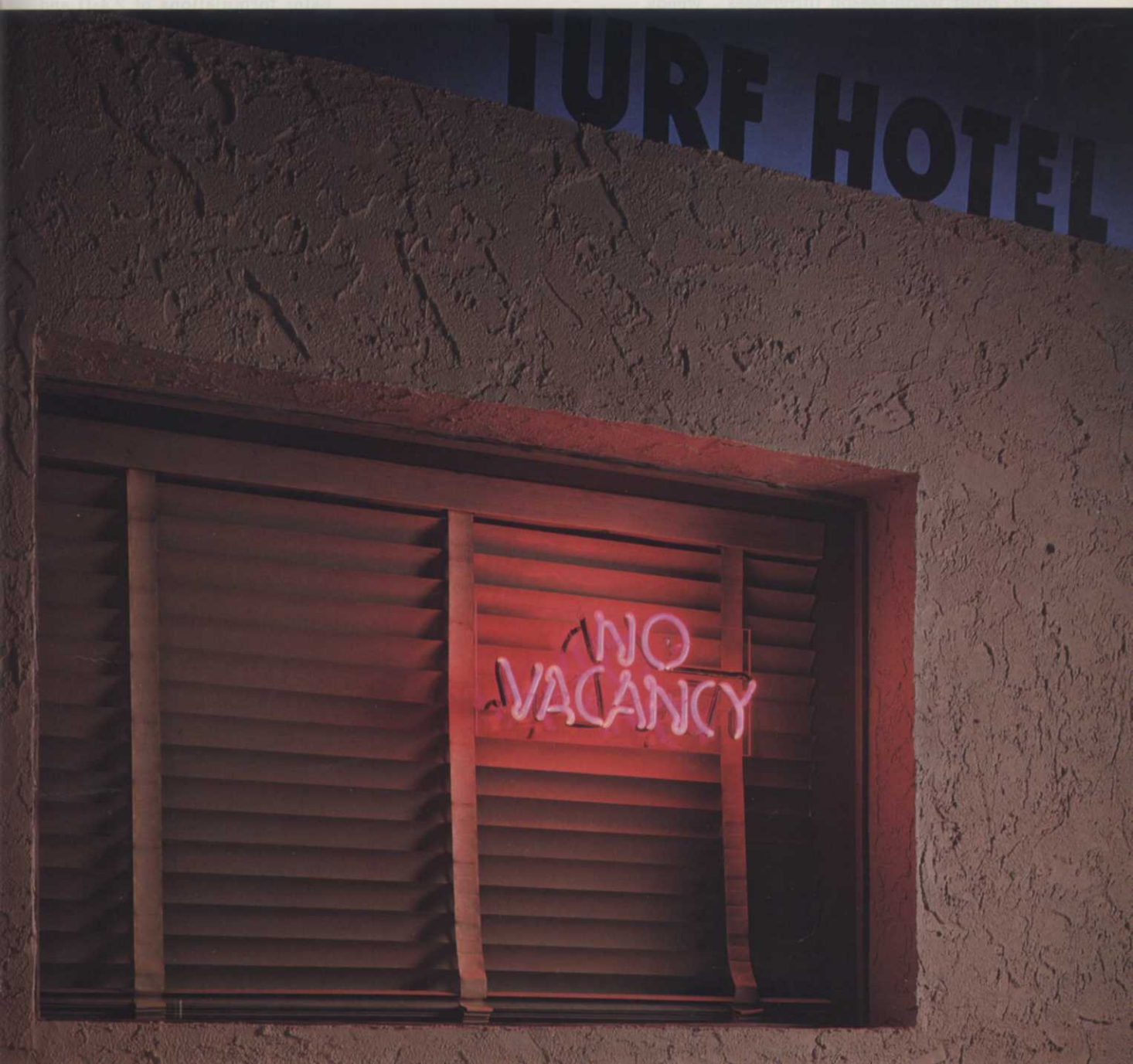

Since most pre-emergence herbicides are not effective against emerged weeds, applications must be made before weed seed germination.

of 60 to 90°F. Applications made below 60°F can result in poor herbicide activity. Temperatures greater than 90°F increase the chance of injury to the turfgrass.

In contrast to pre-emergence herbicides, warm-season turfgrasses differ markedly in their tolerance to post-emergence herbicides. For example, centipedegrass has excellent tolerance to sethoxydim (Poast); however, other warm-season turfgrasses can be severely injured by this herbicide. Also, cultivars within a turfgrass species may respond differently to the same herbicide.

More injury risk

Research conducted in Georgia showed that Meyer zoysiagrass had better tolerance to MSMA than Emerald and Matrella. The risk of injury from post-emergence herbicides is greater during the spring green-up process (transition from winter dormancy to active growth) than when the turfgrass is fully dormant or actively-growing (completely green).

Post-emergence herbicides need a 6- to 24-hour rain-free period after application for maximum absorption. Irrigation schedules should be coordinated with post-emergence herbicide applications to prevent inadvertent wash-off from treated weeds.

Mowing schedules also need to be coordinated with post-emergence herbicide applications. A general rule is to delay mowing three to four days before and after application. The delay prior to treatment increases the leaf surface area of the weed and improves spray coverage and leaf retention. The delay after treatment is needed to allow time for herbicide absorption and translocation processes to occur.

The majority of pre-emergence herbicides used in warm-season turfgrasses are extremely safe to apply near ornamentals. In fact, many pre-emergence herbicides such as oryzalin, benefin + oryzalin, DCPA (Dacthal), oxadiazon and others are labeled for use in landscape ornamentals. Refer to the label to determine if there are any precautions on the use of a herbicide near landscape ornamentals.

Post-emergence herbicides however, can readily injure ornamentals, either by foliage contact or by root absorption. Spray drift injury can be prevented by spraying on calm days at wind speeds less than 5 mph and by using a nozzle tip and spray pressure that produces large droplets.

Ester formulations of 2,4-D and other phenoxy herbicides can injure ornamentals by vapor drift. (Vapor drift is the gaseous movement of herbicide vapors from the site of application.)

Ester formulations usually provide slightly better weed control than amine formulations. However, due to the potential for vapor drift, ester formulations should not be used during the warm months when conditions are favorable for volatilization.

Avoid applying atrazine or herbicides that contain dicamba over the root zone of desirable ornamentals. Ornamentals can be injured by root uptake of these herbicides. Ornamental injury due to root uptake is most likely to occur on sandy soils when a heavy rainfall immediately follows a dicamba or atrazine application.

Proper storage important

Herbicides should be stored in their original containers with intact labels and in areas separate from insecticides and fungicides. Numerous incidents of turfgrass injury occur each year due to a non-labeled herbicide being mistakenly applied as an insecticide or fungicide.

Always keep records of all herbicide and other pesticide applications. The documents can be a valuable resource in the event complaints arise concerning the management practices used on a particular site.

Professional landscape managers probably have more herbicides labeled for use in turfgrasses than any other agricultural commodity. Cultural practices that promote vigorous turfgrass growth, and the timely use of pre-emergence and post-emergence herbicides should enable the landscape manager to grow a high quality, aesthetically appealing, weed-free turfgrass. **LM**

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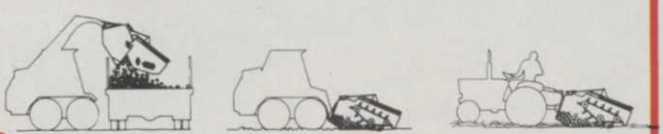

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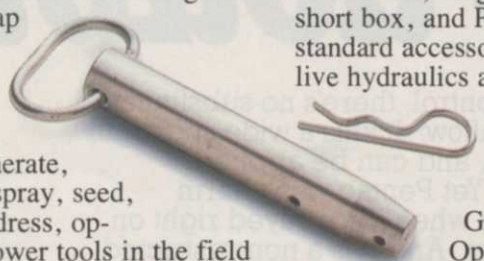

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ATTACKING FROM WITHIN

The latest method of insecticide application in turf reduces surface residues, doesn't require irrigation and may give you better control at a lower rate.

by Will Perry, managing editor

Imagine a day when you get better control of turf insects from an insecticide application you didn't have to water in, apply at a reduced rate and that offers no headaches about surface residues, drift or runoff. That day is today.

The application method is via high pressure surface injection, which has been called a success by university and commercial researchers in warm- and cool-season climates.

The method itself is not new. Injecting polymers for water absorption, nematodes for thatch reduction and low-salt turf fertilizers has taken place for several years. The principle is this: force the pesticide through the surface layer, as deep as soil compaction or thatch levels dictate, and hit the target directly. By doing so you improve the efficacy of the chemical and avoid the problems associated with the residual of pesticides on the turf/soil surface.

Researchers lauditory

"I'm more excited about this technique than anything I've seen in a long time," says Auburn University entomologist Pat Cobb, Ph.D. She is one of eight researchers who recently completed testing of an injection system called Injektaspray, developed two years ago by Cross Equipment Co. of Albany, Georgia. (All of the researchers quoted in this story are recalling their experiences with the Injektaspray system.)

RainSaver, Inc. of Walla Walla, Wash., unveiled the Rain Saver 960 and 360 (formerly the RainSaver Jr.) last month at the annual Golf Course Superintendents Association of America meeting in Anaheim. Both models can be used for high-powered surface injection of insecticides. The units had been on the market as injection applicators of water-absorbent polymers, live microbe formulas and fertilizers.

The machines differ in that the RainSaver units use a series of thin coulter blades set three inches apart on a central shaft, which opens the turf. A nozzle immediately behind the coulter directs the material into the open slit.

The Injektaspray system consists of combined low pressure (30 to 40 psi), low-height topical spray application followed by a high pressure (2,000 psi) ground surface injection. These systems may be operated simultaneously or independently, as needed.

The pesticide is injected directly into the soil using straight stream nozzles through holes in a stainless steel shield pan. The depth of the injection ranges from 1/4 to 1 1/2 inches. Among its most unique aspects is that it doesn't disturb the soil surface, according to the manufacturer.

Harry Niemczyk, Ph.D. at Ohio State University, has been testing both units for Japanese beetle grub control (see related story below). "Subsurface Attack on Grubs").

Mole cricket control

Cobb, Ciba-Geigy senior field research representative Mac Hammond, and field technician Phillip Coburn conducted two extensive tests of the injection process. They used the Injektaspray system with Dursban, Triumph and diazinon in

SUBSURFACE TECHNOLOGY IS PROMISING

OSU research shows it's an idea worth pursuing.

by Harry D. Niemczyk, Ph.D., Department of Entomology
The Ohio State University

Soil-inhabiting turfgrass pests, such as grubs and plant parasitic nematodes, are currently controlled by applying pesticides to the turf surface and then irrigating to move the material to the target. Recent research here has shown that the actual amount of pesticide delivered to the site of pest activity is frequently less than five percent of that applied to the surface. This is especially true in turfgrass situations having 1/2 inch or more of thatch. (Immediate post-treatment irrigation generally delivers enough pesticide to control the target pest.)

Because of this disparity, recommended effective rates for pesticides are set higher than that actually needed at the site of pest activity. This compensates for the relative immobility of the material.

What if?

What if the amount of pesticide actually needed to control the pest could

TABLE 1

MOLE CRICKET CONTROL IN BERMUDAGRASS

Treatment	Rate Lb ai/a	Mean Number of mole crickets per flush* (% control) Pretreat	25 Days Posttreat	50 Days Posttreat
DURSBAN* 50W 350 psi injection	2	3.8	0 (100%)	0 (100%)
DURSBAN microencapsulated	2	5.7	0.2 (9.6%)	1.0 (8.2%)
DURSBAN 50W + Entice	2 + 2 qts	5.3	0.5 (91%)	1.5 (72%)
Oftanol	2	5.2	1.7 (67%)	3.3 (36%)

*Mole crickets flushed in 2′ × 2′ quadrant; two flushes per replicate, three replicates per treatment.

Source: Wayne Currey, Ph.D.

Mobile and Eufala, Ala., on mole crickets.

Cobb says she got "very satisfactory" control of mole crickets with the injection process. She adds that initial data suggests control with reduced rates of Dursban 2E and Triumph 4E, though additional data is still needed.

"From the environmental standpoint, the fact that you don't need to irrigate these chemicals into the soil is of great importance," says Hammond. "The potential for runoff, leaching and exposure to birds or other animals and humans is virtually eliminated by applying the material by injection."

Hammond adds that pesticides traditionally hampered by being quickly bound to organic matter, such as chlorpyrifos pesticides (Dursban), may perform better when injected.

Hammond expects to conduct future tests with diazinon. Cobb is planning to conduct additional tests of subsurface injection for grub control this spring in Massachusetts.

Wayne Currey, Ph.D., formerly with the University of Florida, tested Dursban by injecting it over an eight-week period at 300 to 400 lbs./psi in Florida with a walk-behind unit at 3/4 to 1 inch penetration for mole cricket control. "The injection method was the only method tested that gave us 100 percent control of the mole cricket problem," says Currey (see table 1).

Protecting the market

If early indications are correct that subsurface injection of pesticides allows turf managers to use them at a lower rate, several researchers feel the industry will have greater success protecting the chemicals currently on

See Injection page 66

be delivered directly to the pest's zone of habitation and activity? Such a system of delivery should result in substantial reductions in the amount of material applied to the surface. At the same time, this would have the effect of reducing surface residues to very low levels.

Two systems for subsurface placement of insecticide for control of grubs were evaluated in 1987. The test insecticides, Triumph 4E and Dursban 4E, were applied at 2 lb. active ingredient/acre to a golf course fairway with no thatch at Canal Fulton, Ohio, and one at Wooster, Ohio, having 1/2 to 1 inch of dense thatch.

In cooperation with Ciba-Geigy Corp., a high-pressure injection spray unit, the HPI-2000, manufactured by the Cross Equipment Co. of Albany, Ga., was used to apply the two test insecticides. The unit consisted of a dragging boom with 18 nozzles at intervals of 3 inches that delivered 13 gallons of spray per acre at a nozzle pressure of 1,800 psi.

The RainSaver Jr. (RS), manufactured by Clearwater Industries and made available through Rain Saver, Inc., Walla Walla, Wash., was also

See OSU on page 66

TABLE A

Subsurface placement of insecticides for control of Japanese beetle larvae in golf course turfgrass.

Treatment[1]	Rate lb Ai/A	Method of Application	Post-Treatment Irrigation	Mean % Control Wooster[2] (thatch)	Canal Fulton[3] (no thatch)
TRIUMPH 4E	2	Conv. spray	Yes	76	87
DURSBAN 4E	2	Conv. spray	Yes	5	26
DURSBAN 4E	2	HPI-2000	No	21	40
DURSBAN 4E	2	RainSaver Jr.	No	48	72
TRIUMPH 4E	2	HPI-2000	No	57	82
TRIUMPH 4E	2	RainSaver Jr.	No	69	82

[1] Treatments applied September 9, 1988, replicated 3× and evaluated October 4, 1988 (34 days posttreatment).

[2] Check population = 6.9 grubs/ft²; thatch-mat = 1 inch.

[3] Check population = 24.2 grubs/ft²; no thatch.

Source: Harry Niemczyk, Ph.D.

INJECTION *from page 65*

the market—and perhaps returning products that have been banned.

"It's possible that if we can document the reduced surface toxicity by injecting these materials, it could go a long way toward bringing products like diazinon (which was banned for use on sod farms and golf courses by the Environmental Protection Agency last April) back into the marketplace," says Hammond.

"I think this system may help us keep a lot of the products available today on the market," adds Currey. "I think if we were able get our research under way earlier and got to work with diazinon, we might still be able to use it."

Easier application

"If you have a high pressure injection unit, it pretty much negates the need to water these materials in," says Randy Hudson, Ph.D. at the University of Georgia, who was the first to use and introduce high pressure liquid injection. His data (some of which is presented in table 2) were collected with Ciba-Geigy's Hammond.

"I think the greatest and most important aspect of this application method is the reduced chance for surface exposure after application," says Hudson. "With it we can put a material out there and not have to worry about a child or somebody's pet getting poisoned from pesticide on the surface of the lawn."

Cross Equipment's Injektaspray system has a low-height, low-pressure topical spray followed by a high-pressure ground surface injection.

Tensile strength remains

Ray Dickens, Ph.D. at Auburn University, Cobb, Hudson and Hammond report that their observations are that the Injektaspray system does not damage the tensile strength of sod. "You don't see that you've done anything," says Currey.

Last season one of Alabama's oldest courses, The Country Club of Mobile, became one of the first courses in the country to use high pressure injection of pesticides on its fairways. Shull Vance, course superintendent for 17 years, used Dursban at 2 lb. ai/acre and reported an "excellent" kill with a single application.

"We've tried all the recommended chemicals: diazinon, Dursban, Oftanol and baits, everything. But nothing ever lasted the whole season before. With this system we were able to contract the work out and free up our people," says Vance.

At a cost of $40 an acre, Vance contracted with Hendrix & Dial, Inc. of Tifton, Ga., to inject Dursban on the course's 98 acres of Bermudagrass fairways. The process took three days and did not damage the turf, says Vance. However, the streaks it leaves behind make it impracticable for use on greens for aesthetic reasons, he says.

"The problem with chemicals now is that they break down so rapidly. If the mole crickets don't come up (to the surface) on the night of the application, it's gone. It's like fishing; you don't always catch them," says Vance. "With this system though, you get right at them with a single application."

Only one fairway, which typically undergoes a severe infestation of mole crickets, required a repeat application, says Vance, who used to apply

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used to apply the test insecticides to the above two sites. For the test, the unit's coulters were adjusted so the insecticide depth of ½ to ¾ inch below the surface. The unit was calibrated to deliver a volume of 132 gallons of spray per acre.

The HPI and RS systems were compared to the standard method of applying liquid insecticides for grub control, namely, treatment followed by irrigation. Both Triumph and Dursban were applied at a volume of 4 gallons of spray per 1,000 sq. ft (174 gallons per acre) and immediately irrigated with ¼ inch of water (i.e., zero time elapsed between application and irrigation).

Residues and control

To compare residues remaining on the grass blades following treatment, samples of grass were collected from each treatment on the day of application. Plots receiving conventional sprays were sampled before and after irrigation, while those treated with the HPI and RS systems were sampled immediately after application. Residues were extracted within three hours after collection and analyzed by gas chromatography within three days.

The RainSaver Jr. opens the turf with coulters before material is sprayed in.

Effectiveness of the treatments for control of Japanese beetle grubs was determined 34 days following treatment.

In areas with no thatch, HPI was best with 69 percent control. The conventional system gave 26 percent control and RS 72 percent control. At Wooster, all three systems registered low control levels. Control with RS was best (48 percent), which was a substantial improvement over the conventional system (5 percent) in turf with thatch.

The conventional method provided better control with Triumph in turf with thatch than either HPI or RS. Control from the conventional method in turf without thatch was 87 percent and 82 percent with HPI and RS.

Thatch penetration

In order to obtain insight into the depth of penetration achieved by the RS and HPI systems, both machines were loaded with a solution of blue dye and application made to the Wooster fairway with thatch. The HPI left clearly visible amounts of dye on the turf surface, while the amount remaining after application with RS was nearly imperceptible.

A cross-section of the turf treated with HPI revealed penetration of only ¼ inch into the thatch. Examination of the slit made by the RS coulters showed dye distribution to the soil level as well as on the entire depth of the thatch.

The RS and HPI were loaded with water and application made to two bentgrass putting greens at Canal Fulton. Both systems left only thin lines of penetration on the green, leaving the surface virtually unchanged for putting.

Irrigation following the conven-

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TABLE 2

THE EFFECT OF CONVENTIONAL SPRAY APPLICATION AND HIGH PRESSURE LIQUID INJECTION (HPLI) ON MOLE CRICKET POPULATIONS IN TURF.

MATERIAL	RATE LBS. AI/Ac	METHOD	WEEKS POST-TREATMENT MOLE CRICKET TUNNELS/18 SQ. FT.			
			1 wk	2 wk	3 wk	4 wk
Triumph 4.0	2.0	CONV.	2.5b	1.3b	1.8c	5.8b
Triumph 4.0	2.0	HPLI	2.8b	1.0b	1.5c	3.3b
Diazinon 4.0	4.0	CONV.	7.0ab	9.5a	9.5ab	11.5a
Diazinon 4.0	4.0	HPLI	3.5b	4.0b	6.3b	7.8ab
Check	—	—	9.8a	11.5a	11.8a	12.5a

Data analyzed using Duncan's MRT

Source: Randall D. Hudson, Ph.D.

pesticides as many as four or five times a season. Mole crickets were killed when they returned to the site in the days following the application, says Vance.

Other companies Vance contacted about contracting Injektaspray applications included Turf Control, Inc. of Thomasville, Ga. and O'Hearne Farms, Inc. of Auburn, Ala.

Hard data on the efficacy of insecticides applied via subsurface injection at a lower rate has yet to be published. But Vance plans on reducing by half his Dursban application this year. This notion is shared by Currey, who says "With the injection system you could probably get by with reduced rates, but we haven't researched that yet. I would surmise that you could, based on what we've seen, in light of the rates we applied."

Doug Houseworth, Ph.D., is manager of technical support at Ciba-Geigy's Turf and Ornamental Department. He has been studying subsurface application for two years. He is convinced that the increased efficacy achieved by injecting the pesticide will give the lawn care operator (LCO) adequate insect control at a reduced cost.

"From our research, it appears we can substantially decrease the chemical rate," says Houseworth. "We feel that this is a way we can reduce the environmental safety hazards that are present in many lawn care insecticides.

"And it's not going to take people long to figure out that they can save a heck of a lot of money by using reduced rates of chemicals. Money that they can put toward the purchase of the necessary equipment." **LM**

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tional application reduced grass residues of Triumph 43 percent (from 47.3 to 26.8 ppm) and Dursban 51 percent (from 78.8 to 38.8 ppm). HPI reduced Triumph residues 63 percent (26.8 to 10.1 ppm) and Dursban 38 percent (38.8 to 24 ppm) over the amount remaining after irrigation of the plots treated with these insecticides using the conventional method. Residues of both Triumph and Dursban were reduced 95 percent (to less than 1.4 ppm) by the RS application, confirming that the RS system resulted in the lowest grass residues.

Grub control with HPI was poor in thatch because of inadequate penetration. Control with RS was better but not as good as that from the conventional application of Triumph, and less than expected from Dursban at both test sites.

Application of the dye showed the probable reason may have been that the insecticide (like the dye) was distributed along the face of the thatch or soil in the slit made by the coulter instead of being deposited directly to the zone of grub habitation at the bottom of the slit. This is easily corrected. With such modification, the coulter principle appears to have the best potential for direct delivery of materials and near elimination of surface residues.

The deep penetration of blue dye into this turf following application by the RainSaver Jr. shows the advantage of subsurface injection.

TABLE B

Residues on grass blades following attempts at subsurface placement of insecticides for control of Japanese beetle larvae in gold course turfgrass.

Treatment	Rate lb AI/A	Method of Application	Irrigation	Mean ppm Residues Canal Fulton[3]	Wooster[4]
TRIUMPH 4E	2	Conv. spray	Before[1]	47.3	
TRIUMPH 4E	2	Conv. spray	After[2]	26.8	
TRIUMPH 4E	2	HPI-2000	None	10.1	13.2
TRIUMPH 4E	2	RainSaver Jr.	None	1.4	1.3
DURSBAN 4E	2	Conv. spray	Before[1]	78.8	
DURSBAN 4E	2	Conv. spray	After[2]	38.8	
DURSBAN 4E	2	HPI-2000	None	24.0	11.1
DURSBAN 4E	2	RainSaver Jr.	None	1.3	1.5

[1] Sample collected after application dried but BEFORE POSTTREATMENT IRRIGATION (ca. 1 hr.)

[2] Samples collected AFTER IRRIGATED GRASS DRIED (ca. 1 hr. after irrigation and 2 hr. after treatment).

[3] Mean residues based on separate GC analysis of 5 pooled 1 ft² samples of grass blades from each of 3 replicates.

[4] Means residues based on separate GC analyses of 8 pooled 1 ft² samples of grass blades from each of 2 replicates.

Source: Harry Niemczyk, Ph.D.

Looking good

The RS and HPI subsurface placement systems showed sufficient potential to warrant further research and development. The HPI may have limited application in cool-season areas where thatches are often too dense to permit delivery of materials to the soil level. However, this system may have further application for control of insects such as mole crickets in warm season areas where thatch may be less dense.

Further research on subsurface placement of insecticides is planned for 1989. A new "riding" version of the RainSaver Jr. modified to directly place materials to the bottom of the slit made by the coulter will be made tested here. In addition, several pieces of overseeding equipment with coulters will soon be modified and evaluated for their potential to place granular products beneath the turf surface.

Other applications

Potentially, the subsurface placement principle could be used to deliver many materials, such as certain fungicides, herbicides, nematodes parasitic on insects, and others.

With modification, these systems should more accurately deliver materials directly and only to the subsurface target zone at rates only a fraction of those currently needed. In addition, other materials, now ineffective because of immobility in thatch and/or soil, may show effectiveness when placed directly in the zone of pest activity.

The placement of pesticides under the soil in turfgrass without thatch, or at the soil surface under thatch, increases the potential for these materials to move downward through the soil. However, this potential should be at least substantially reduced if not negated by greatly reduced application rates.

Research here will contiune to focus on the dissipation and mobility of test materials. **LM**

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HOW WILL YOU DO THIS YEAR?

The first step in reaching your 1989 goals is to put together a zero-based budget.

by Dr. Rudd McGary

Too many companies in the green industry underestimate the value of a well-conducted business forecast. Yet the most successful companies use forecasting as an important management tool and are more likely to succeed in the long term because they have a plan to assess performance throughout the year.

Without this notion of accountability, management cannot have a complete grip on the company.

While some companies in the green industry still operate on a day-to-day basis, the competitive nature of the industry today dictates that a forecast be done. The path the company is to follow needs to be projected into the future if it is to succeed.

Generally, there are two ways green industry companies should go about forecasting this year's business. Most have a tendency to forecast judging by last year's figures. In addition to this method, a zero-based budgeting system should be implemented.

Management information

In order to forecast by using last year's information, it's important that the information be in workable form. Too often companies compile mounds of data and forget to turn it into usable information. Some of the key parts of information you need to note are:

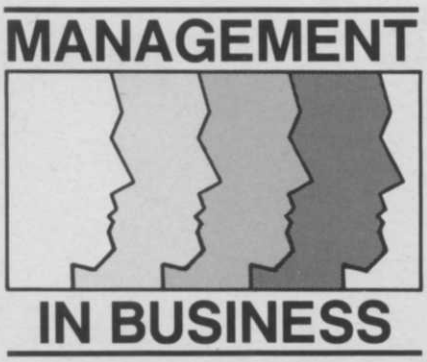
1. Your source of leads. Was it referral, direct mail, yellow pages, television, newspaper, radio, teleselling, outdoor or advertising in this magazine?

2. Leads by type. How many leads did you get from each of these advertising vehicles?

3. What was your closing ratio by source of lead? Did certain types of leads result in better sales closings? Referral leads almost always have the best closing ratio for a service company.

4.What was your cost per lead? This figure is the total cost of attraction divided by the number of leads it generates.

Rudd McGary, Ph.D., is a senior consultant with All-Green Management Associates, Columbus, Ohio.



5. What was your cost per sale? Simply divide your total advertising cost by the number of closes.

6. Who is selling? Identify the salesperson who gave you the best closing ratio and note the type of leads that were utilized.

7. When did your leads occur? Using this type of information will help us get to a zero-based budget. This simply means that you start with information on last year's performance and base your forecast on assumptions not linked to the previous year, but rather to actions you intend to take this year.

To make this a little clearer, many companies take last year's sales and add 10 percent, using this number as the new goal in a sales area. This may work for some companies, but it doesn't indicate how the company is going to reach these new goals.

If you use a zero-based budgeting approach you will use information from last year and interpolate your management time and skills into the forecast. Basically you're saying, "Last year we closed 80 percent of all leads we got through referrals. We had 80 referrals and 64 closes to get that number. This year we are going to be more aggressive in seeking out referrals and expect to get more than 150. If we do that and continue to close at 80 percent, we will close at least 120 new sales this year as a result of actions we take to increase referrals."

You then need to plug this number into the sales line for 1989, with the appropriate times and sequencing for referral leads that you know from last year's information. This is only a part of the total sales figure, but it will give you a start on your sales numbers.

At the same time you put this number in place in the forecast, you must make sure that you have made someone in the organization responsible for getting and closing these leads. It's one thing to say you're going to get leads, it's another to get them and to make sure someone closes them. In other words, you need to make an action plan for this particular part of your sales.

Segmenting targets

Even before the process of forecasting begins, you need to consider the segments of the target you want to forecast. In order to forecast correctly you need to look at last year's information, this time with a different view than that above. The key parts of information are:

1. What characteristics of last year's customers are the same? For example, do your customers live in the same area in the same type of house? Do they make the same income? Are they the same age? These types of questions will help give you a profile of your past customers.

2. Can you reach the profile you construct with some action by the company and how much will it cost?

3. Who will be in charge of reaching these people?

If you take these simple questions seriously when you are doing your forecasting, you will be able to assign responsibility to the sales staff and determine who your most likely customers are going to be. Remember, consumers that are similar to your current customers are most likely to buy what you are offering.

You must take both sets of questions seriously if you wish to prepare a forecast. You need to know who your current customers are and understand the numbers behind how they became your customers. By putting this information together in a zero-based budget, you will be able to forecast the upcoming year and gain control from a management point of view. **LM**

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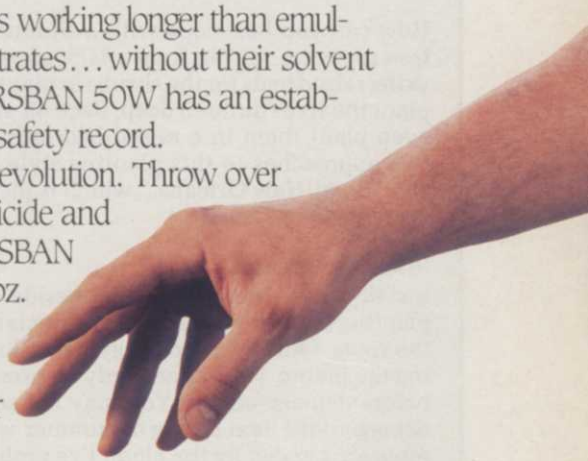

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Circle No. 118 on Reader Inquiry Card

THE UNSEEN KILLER

Subsurface drainage is one of the keys to keeping grass, trees and shrubs healthy. But without a few 'tricks of the trade' suggested here, it's difficult to monitor.

by Ricks H. Pluenneke, Ph.D.

Too often when the importance of internal soil drainage is mentioned, people misunderstand. That includes some professional engineers and landscape specialists. They tend to think in terms of the water they can see moving across the surface. So they work hard to improve that water's exit from properties with concrete-lined ditches, proper slopes and surface improvements.

They don't realize that water is also slowly flowing downslope beneath the surface where it can run into concrete curbs and other obstacles that act as dams in its path, causing it to accumulate and kill plants growing there.

Ricks Pluenneke is a plant science consultant to industry and institutions with an office and laboratory in the Dallas/Fort Worth, Texas, area. He is also a Certified Professional Agronomist, Certified Professional Chemist and Certified Professional Crop Scientist.

Plants as traps

Concrete ditches and drains help, but they still don't directly address some of the drainage problems we often build into our landscapes. Water often lies trapped in subsurface depressions. These are created by digging holes in tight soils like clay, and then backfilling them with mixtures of sandy loam, organic material, gravel and all kinds of "improved" backfill combinations. These traps are often freshly-dug tree or shrub pits, recessed flower and groundcover beds, and similar areas in turf that have been "improved" by backfilling with "better" soil.

Soils, to varying degrees, are composed of organic material (humus), clay, sand and silt. The particles that make up clay are about 1,000 times smaller than those in a sand. Clays retain both the good (fertilizers) and bad (salts) extremely well. Sand does not.

Taking a look at the roots

How can you best cope with a situation where young tree roots are rotting from a lack of oxygen? Consider using raised beds for the shrubs or plant on slopes. Don't plant the trees quite so deep. Back off an inch or two, or even plant them in a raised-bed fashion. (I've named two approaches to this planting style "New Orleans" and "Semi-New Orleans," which is pictured here. Forgive me, New Orleans.)

Inspection tube

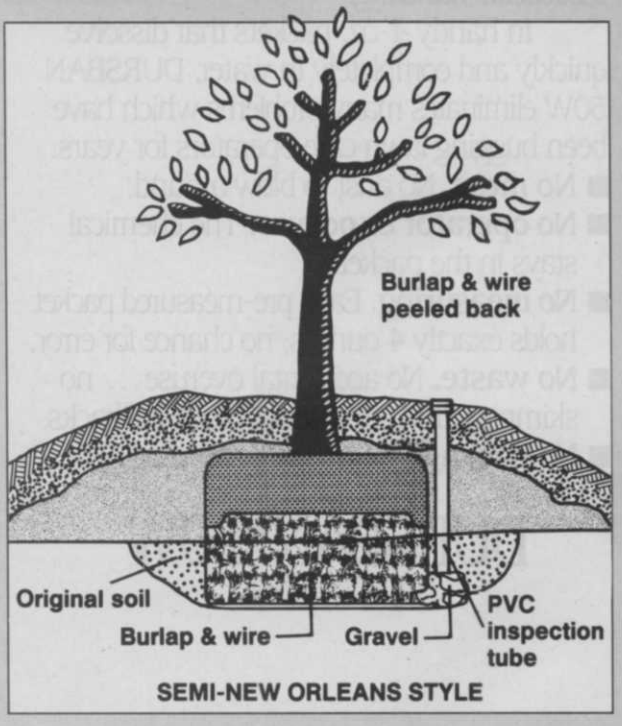
Install a PVC inspection tube beside each tree when planting them so you can see if water is standing around the roots. Otherwise you may never know what's killing the plants. Water need only be present for 48 hours before damage begins. You may not see actual foliage damage until next spring or summer when those extra roots are needed by the plant. I've probably reinvented the wheel with PVC inspection tubes, but I've been on a crusade for them for years, trying to get landscape professionals to use the tubes more in tight, poorly-drained soils. They're simple, cheap and effective. I use another version on containerized plants too.

Cut a piece of PVC pipe (some people use four-inch diameter, others use smaller) to a length so that it will reach from the bottom of the hole to the surface, and preferably a couple of inches beyond. Put an end cap on it. Leave it white, paint it brown or green, etc. They are easy to put in at planting time, but hard to put in as an afterthought. Smaller versions are helpful in shrub beds and at other places in the landscape.

Backfilling helpful

When planting trees, consider putting the original soil back in the holes around the balls (and an inspection tube). Put a shovelful of gravel around the bottom of the inspection tube. Use your organic mulch, peat moss or pine bark on the soil surface, surrounding the planted tree and extending out past the edge of the ball six to 12 inches. Check the inspection tube during irrigation and wet weather to see if water is standing around the ball excessively. If it is, find a way to siphon it out and/or cut down on watering.

-Dr. Pluenneke



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Circle No. 125 on Reader Inquiry Card

Over-the-top picture-perfect weed control.

Fertilizers and other salts are readily leached out of sands, so more frequent applications are normally needed. With regard to particle size, silt is intermediate to clay and sand, and has many of the good properties of both and fewer of the bad ones. The relatively large pore spaces in most sands allow water to be absorbed rapidly, but it's retained much longer by clay soils.

However, if a sandy soil is in a no-drain hole pot or has been used as "improved soil" in a poorly-drained hole in clay soil, salts cannot drain away. They will accumulate until they cause damage. In a properly constructed raised bed, they could freely drain away with excess water.

Water moves slowly through clay soil, since it has such small pore spaces between its tiny particles. It moves even slower if the soil has been compacted by equipment during construction, or even by excessive foot traffic (athletes, etc.), particularly when the soil is wet.

Low-salt diet

A high sodium content in the soil will cause clay to collapse and become more dense, decreasing water movement through it. Irrigating with soft water (high in sodium and low in calcium) can increase this problem.

Let's assume you're putting in a new landscape and the existing soil is mainly clay. There may be some areas in the landscape where water tends to stand, so you order a few loads of a good sandy loam and smooth it out across the property, giving it a nice 6- to 8-inch layer of topsoil. Then a sprinkler system and sod, St. Augustine for example, are put in.

During the season you also dig holes two feet deep to plant red oaks and replace the soil that came out of the holes with a nice mixture of loam, peat moss and sand. You also dig two long beds along the front of the new building, 12 to 18 inches deep, replacing the soil with the same improved soil and plant shrubs there.

A year passes. The grass is nice and green, but some of the red oaks have what looks like fall foliage—in April. Two die by the following spring. Several shrubs are looking sick, too. The boss says water them more, so you do. In one or two locations, the St. Augustine tends to develop disease problems in the spring. What's happening?

Let's make a slice down through the landscape so we can see what's happening. We find that beneath the surface, water stands for long periods in the porous soil of the tree pits like it does in a pot with no drain holes. It's practically impossible to overwater a plant that has reasonable drainage, but you have to water poorly-drained plants *very* carefully.

Water accumulation

Water accumulates in the tree pits, in this case from heavy irrigation of the lawn, and stands there for long periods during wet weather too. Young roots rot from lack of oxygen in the stagnant water. Disease problems may be favored, too. Similar things are happening in the shrub beds, where water from the roof adds to the situation. You can't see the problem, because the "improved" porous soil hides it. But it's there.

If you anticipate an excessively wet situation, plant trees and shrubs whose habitat normally includes wet sites along sloughs and creeks. The trees might include cedar elm, bald cypress, willows, sweetgum, birches and others.

The problem with the St. Augustine is from standing puddles (beneath the loam) that are contributing to disease problems. It's always better to fill in depressions in turf with soil similar to the original soil before putting the loam on top. Also, be sure to "scratch up" the surface of the original soil before applying the new one. This will help avoid an interface between the two.

We've gotten it into our heads that humans and animals use oxygen, but green plants make oxygen and use carbon dioxide. That's not right! Humans, animals *and* green plants use oxygen 24 hours a day. Green plants do use carbon dioxide and make oxygen when they have enough light to run photosynthesis. The roots of green plants constantly need oxygen—even to take up water.

That's why plants standing in a flooded field will commonly be wilted. It's also why the symptoms for overwatering and underwatering are often the same. It's practically impossible to overwater a plant *if* it has good drainage. If the roots remain in a supersaturated mess for even a day or two, some roots will likely die.

Don't underestimate the importance of a good constant oxygen supply to plant roots. Without it, root growth, proper nutrient and water uptake, and many other systems essential to the plant may be seriously affected. **LM**

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Circle No. 193 on Reader Inquiry Card

John and Beverly Runion show Everett Mealman (center) a sample of the manicured look they are able to achieve by using Atrimmec on Bar Harbour juniper and English ivy. Runion uses Atrimmec on 5 species of juniper; 3 species of ilex; various species of azaleas; cherry laurel; ligustrum; viburnum; several varieties of arborvitae and varieties of cotoneaster. All of them have held up for a full year with only one treatment except for the danmeri variety of cotoneaster, which required two treatments.

Cut trimming and pruning labor costs 50% or more:

Every groundskeeper who spends any time using or supervising the business end of a hedge clipper can benefit from the experiences of John Runion, groundskeeper of the Washington Science Center in South Rockville, Maryland.

Everett Mealman, President
PBI/Gordon Corporation

"Finding out about Atrimmec® is one of the most fortunate things that has happened to us in the 15 years we've been taking care of the grounds here at Washington Science Center." Those are the very words of John Runion when he welcomed us into his office.

To fully appreciate the significance of what he says, you need to know that the Washington Science Center is a 40-acre office complex designed to attract very prestigious tenants, and a major selling point is the pristine beauty of the landscaping.

Management's goal is to provide an atmosphere where some 5,000 people can actually look forward to coming to work because each day is another picnic in the park.

"But it's a commercial venture," smiles Beverly, Runion's wife and shoulder-to-shoulder partner. "We're all very cost conscious."

Hedges and shrubs look better with less effort and cost

"Our records show that Atrimmec has reduced our trimming and pruning costs by 70%," says Runion. "But that's only part of the story. Atrimmec has also improved the appearance of our hedges and shrubs by making them thicker and keeping them more shapely."

To prove his point, Runion showed us the maintenance records on the ilex hedge that is pictured on the opposite page. The hedge is three blocks long and, until the advent of Atrimmec, Runion had to give it a heavy pruning every spring, which required one full week and two touch-ups during the year to eliminate those stragglers that can so devastate meticulous landscaping.

Interestingly, the hours and hours it used to require for trimming was only part of the horrendous cost. There was also the expense of cleaning up and disposing of the debris, which used to fill 12 dump carts and cost 5¢ a pound to haul away and deposit in a commercial landfill.

Today the maintenance program for the hedge consists of a light touch-up once a year, followed by a spray treatment of Atrimmec. The trimmings, according to Runion, don't even

Runion demonstrates the lateral branching activity of Atrimmec. This ilex stokes bush was partially defoliated by falling ice and, prior to his discovery of Atrimmec, would have been replaced. But now, thanks to Atrimmec, new lateral growth is occuring and the bush will soon be restored to its original thickness.

Runion shows Mealman the actual records that prove Atrimmec has reduced the maintenance cost of the ilex hedge in the background by 70%. According to Runion, Atrimmec has also made the hedge much thicker and more attractive. He says that prior to using Atrimmec there were blank spots so big a man could walk right through them. The hedge is three blocks long, and has become a landmark for identifying the location of the Washington Science Center. When Runion used to trim this hedge mechanically, it required a full week and 12 carts to haul off the debris.

fill three little trash bags, and the total cost is reduced by at least 70%.

Equally, if not even more, important for Washington Science Center is the appearance of the hedge. "We used to have places in the hedge that a man could walk right through," says Runion. "But since using Atrimmec, the blank spots have completely filled in, and hardly a day goes by that we don't hear a compliment about it."

Do you have a question about using Atrimmec?

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Accordingly, we have a knowledge of which plant species will respond to Atrimmec, how much to apply and, even more important, when to apply it in your region.

For information, call us toll-free. Not only will we answer your questions about using Atrimmec, we will send you a trimming-cost calculator guide so you can determine how much money you can save by using Atrimmec. We will also send you a little solar-powered, shirt-pocket calculator to help you with the mathematics.

FREE Calculator

Schematic drawing shows how Atrimmec works.

When applied to broadleaf ornamentals, Atrimmec blocks the plant hormones that stimulate apical growth and redirects the plant's energy toward lateral branching. Ornamentals will retain the shape to which you trimmed them, and will grow thicker and more beautiful because of lateral branching. It is not necessary, however, for ornamentals to be trimmed to activate Atrimmec. You may spray them without trimming if you desire, and they will not only retain their original shape and size, but will also grow thicker and more attractive.

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Circle No. 163 on Reader Inquiry Card

ATRIMMEC®

LEARNING WHILE YOU REST

Whoever believes learning about plant classification is boring has never been to the Chicago Botanic Garden's Heritage Garden.

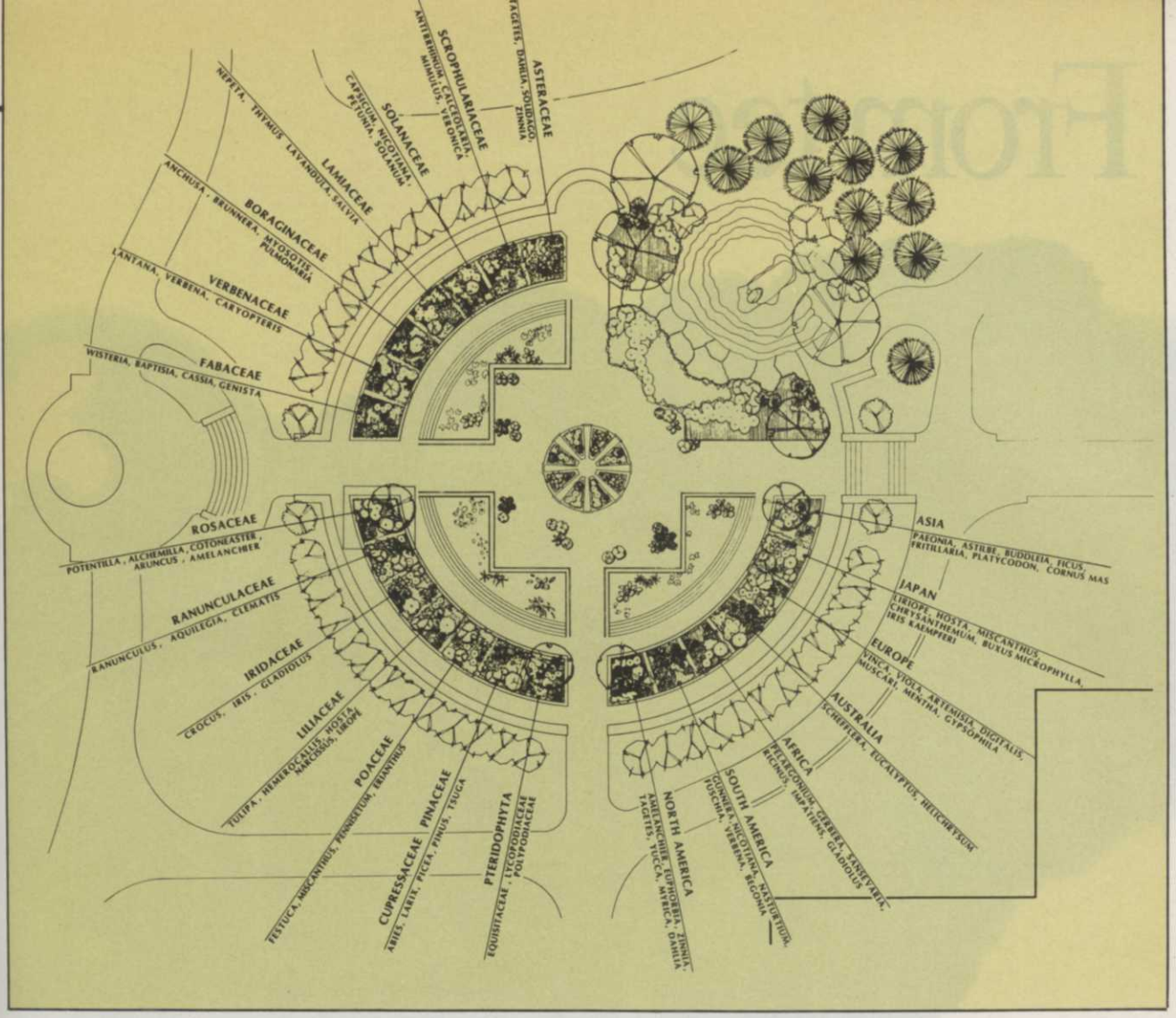
by Will Perry, managing editor

In a city, a garden takes on a special, almost spiritual significance. It's a place where the form and order of concrete, glass and steel bow to the earth and sun. A place where city-dwellers can go to be reminded of their individuality.

The Chicago Botanic Garden in Glencoe is such a place for Chicago-area residents and visitors. Its purpose exceeds providing the respite craved by thousands of Chicagoland residents, though certainly the tranquility of the site offers it. The Garden has taken upon itself the mission of stimulating interest in and appreciation of horticulture to its visitors. It has therefore become more than an urban escape route. It is a campus for students interested in meshing progress and nature better—and enrollment is growing.

Nowhere at the Garden is this mission more obvious than at

The Heritage Garden is based on the Botanic Garden of Padua of 1543, considered the first true botanic garden of western civilization.



the Heritage Garden. Installed in 1983, the 1.5 acre site is ideally located between the parking lot and the Education Center, thereby serving as a sort of foyer where the visitor is introduced to the world of plants. You approach it across an elegant sweep of steps lined by cascading water, flowers and planters. The Garden's purpose, as stated by its designer, landscape architect Geoff Rausch of Environmental Planning and Design Partnership, Pittsburgh, is to "present the historic and scientific value of plant classification in an interesting and aesthetically pleasing setting, and to promote the role of the botanic garden as a scientific institution."

The Heritage Garden design is based on the Botanic Garden of Padua of 1543, considered the first true botanic garden in Western civilization. The central walk is made of red brick, called Calvert Colonial Paver in 20 to 20 rose full range color and limestone veneer. The brick was supplied by Victor Cushwa & Sons, Inc., of Williamsport, Md. and the stone by William C. Weber Stone Co. of Stone, Iowa. The walk is reminiscent of the paving patterns used in Padua. At the garden's center is a physic garden, which contains potted specimens of tender plants and floats over a large lilly pool of aquatic plants. The raised stone planters at the perimeter contain beds arranged by plant families.

A fitting tribute

The Garden is divided into four quadrants that represent the four seasons and the four corners of the earth. One of the quadrants contains a large bronze sculpture of Carl von Linne (Linnaeus) designed by Robert Berks. Linnaeus, whose binomial system of plant classification and nomenclature brought form and order to the field of biology in general and horticulture in particular, is captured kneeling beside his notebook, studying a rose. The contrast between the comparatively disorganized planted area along the gateway and the organized garden is in itself a tribute to Linnaeus and his work. The plants that complement the statue are low-growing shrubs and ground covers for the most part.

The remaining three quadrants are devoted to teaching about plant classification. They include plantings grouped by geographic area and plantings grouped according to a taxonomic system.

The geographic quadrant summarizes classification by origin, a system used at many botanic gardens in Europe. Since many different climates are represented, certain plants are grown in greenhouses and set out in the summer.

The two quadrants with taxononic plantings are arranged according to the Englerian system, a morphological system based on observed similarities and complexities of flower parts.

Pools filled with bubbling jets surround a physic garden at the site's center.

It is hoped visitors to the Heritage Garden will begin to understand modern plant classification systems. It is believed that this understanding is the first step toward appreciation. **LM**

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Circle No. 172 on Reader Inquiry Card

GELS, WETTING AGENTS FOR TREES AND SHRUBS

The success of these products in reducing moisture stress in turf is well documented, but their ability to do the same for woody plants may be a pleasant surprise.

by Terry A. Tattar, Ph.D., University of Massachusetts

Moisture management is important for the health of all woody plants. It is especially critical for newly-transplanted materials. Loss of plant materials on new landscapes from moisture stress is all too common.

Moisture stress is usually the result of excessively dry conditions on new transplants, but can also be due to excessively wet conditions that smother the roots. Losing plant materials is costly to both landscapers and nurserymen who must replace the lost plants and absorb these additional costs.

Landscape managers should more effectively manage moisture levels in newly-transplanted trees and shrubs. Wetting agents and, more recently, super-absorbent gels, have been used extensively with turf to improve survival and establishment. Why not use them on woody plants?

Wetting agents

Wetting agents are chemicals that lower the surface tension of water, and thereby allow a more rapid and even penetration of irrigation water in the soil or growing medium. They are in a class of chemicals known as surfactants.

The objectives of using a wetting agent are to promote even soil wetting, to minimize runoff and to provide better aeration and drainage; all of which will improve conditions for root growth. Despite widespread use of wetting agents in turfgrass management, these agents have not been widely used on woody plants.

A study was conducted in 1985 in Central Park, New York City, using the wetting agent Aqua-Gro around newly-planted trees and shrubs in an attempt to improve woody plant sur-

Wetting agents allow water to penetrate deeper and be distributed more evenly; providing better rooting conditions for woody plants.

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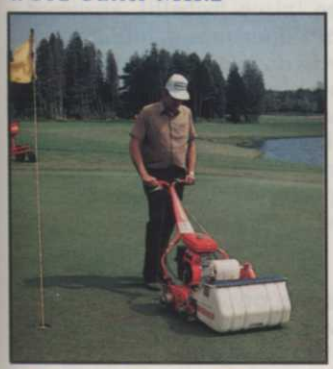

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Circle No. 109 on Reader Inquiry Card

The survival rate of three species studied at this Florida site was improved when a super-absorbent gel was used during transplanting.

vival. During the study, the City of New York imposed a total watering ban. Test plants received only rainwater, no supplementary irrigation. Most of the trees and shrubs treated with the wetting agent producd increased terminal growth in comparison to the untreated plants.

Further studies using the same wetting agents were conducted in 1986 and 1987 in western Massachusetts on newly-planted trees and shrubs on new condominium sites. The test materials consisted of azaleas, Rhododendron spp., P.J.M. rhododendrons, P.J.M. Hybrid rhododenrons, *Potentilla fruticosa*, flowering crabapples, Malus spp. and Norway maples (*Acer platanoides.*) On most sites the survival rates and overall condition of the plants treated with the wetting agent was improved over the untreated controls.

Research continues on the specific effects on plant roots. It is known, however, that plant growth is favored by uniform levels of soil moisture as well as adequate soil aeration.

A possible explanation for this increased survival and growth of the plants treated with the wetting agents in these studies is that the wetting agent improved the soil environment for root growth by increasing water penetration and providing more even distribution of water.

Super-absorbent gels

Super-absorbent gels are very long molecules (polymers) that have the capacity to absorb 50 to 600 times their weight in water. They are used to store water in the soil around plants and then release that water to the soil during dry periods. Forty to 98 percent of the water absorbed by the gels will eventually be available to the plant roots or soil.

The two general types of superabsorbent gels are starch-based and synthetic-based. But due to their limited stability in the soil, starch-based gels are not widely used. Most gels used in landscaping are synthetic-based and are known to be effective for at least two years in the soil.

Gels are applied at recommended rates in a dry state and mixed with soil at the bottom of the planting hole and backfill soil. The plant is then irrigated and the gel becomes completely hydrated in less than one hour.

Using a super-absorbent gel during planting provides a water reservoir to minimize moisture stress and provides conditions for root establishment, thereby improving plant condition and avoiding plant loss.

A 1987-88 study in south Florida used the synthetic-based super-absorbent gel Supersorb-C. The author studied its effects on survival and growth of ligustrum (*Ligustrum ovalifolium*), Ixora, Ixora sp.; and hibiscus (*Hibiscus rosa-sinensis*) recently transplanted in landscapes. All plants were transplanted from one-gallon containers. The study was conducted with plantings made throughout the year, in both wet and dry seasons.

The survival rate of all three species was improved when the super-absorbent gel was used during transplanting when compared to controls. In addition, the average growth rate was also greater when the gel was used during transplanting. The soil condition around the gel-treated plants was noticeably softer and more spongy to the touch than untreated soils.

In western Massachusetts, at the University of Massachusetts' research nursery, a study was conducted last summer to determine survival and condition effects of the same super-absorbent gel on native trees and shrubs. The following plants were used: eastern white pine (*Pinus strobus*), white spruce (*Picea alba*), Colorado blue spruce (*P. pungus*), amur privet (*Ligustrum amurense*), eastern hemlock (*Tsuga canadensis*), weigela *Weigela florida*), common mockorange (*Phadelphus coranarus*) red spirea (*pirea frobelli*), arrowood viburnum (*Viburnum dentatum*) and yellow twig dogwood (Cornus lutea).

All the plants were local B & B stock. Planting was done in midsummer and irrigation was provided only at the time of planting. Equal numbers of each species were planted with the super-absorbent gel and without the gel.

Early results positive

Very few plants were lost in either treatment to this date. However, the gel-treated plants were consistently rated higher in condition than the untreated plants. This study is part of a long-range effort to determine the most effective strategies for moisture management in the landscape and will continue for at least three years.

Moisture management is critical for successful establishment of trees and shrubs in the landscape. Studies with a wetting agent and with a super-absorbent gel have indicated that these types of materials may provide a beneficial affect to plant condition, survival and growth of trees and shrubs. The landscape contractor may wish to consider the use of wetting agents and super-absorbent gels in new landscape installations as aids to successfully establishing plant materials. **LM**

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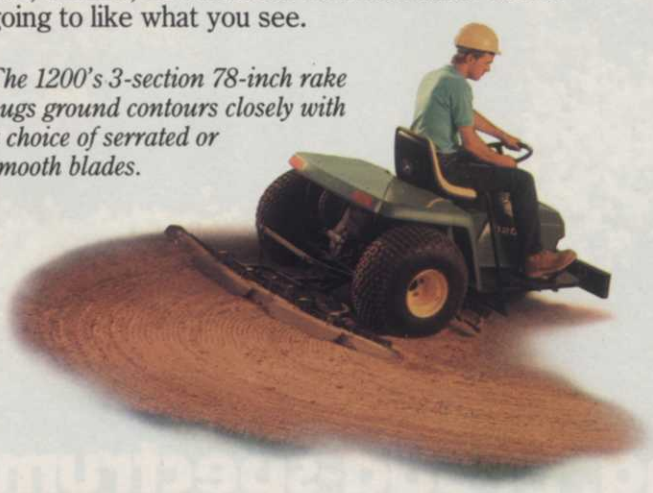

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1200

Project managers Steve Plummer (left) and Butch Foster look over water irrigation plans for the 18-hole Tustin Ranch course.

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Planned to conserve and built to hazard. That's precisely what America's top golf course designers had in mind as they planned and constructed the irrigation system for The Irvine Company's new $10 million, championship-quality Tustin Ranch Golf Course.

Conceived by world-renowned golf course architect Ted Robinson, the 18-hole course's network of lakes, cascading waterfalls and meandering waterscapes will not only serve as scenic and strategically placed water hazards, but will also provide a functional irrigation system that will ultimately conserve millions of gallons of water annually for Orange County.

"The lakes scattered around the course will provide golfers with handicapping, yet beautiful obstacles while they serve the community and the county by helping to save precious water," said Robinson, who has developed more than 120 courses worldwide during the past 25 years. "By using the lakes as reservoirs instead of continually pumping water into the area, we can help conserve several thousand gallons of water every week."

Not just deserts

Robinson pointed out that using lakes as water-saving elements at golf clubs, a technique first developed in the design of desert courses, is becoming more common in water-conscious areas such as Southern California. Courses typically require a substantial amount of water which can be wasted through improper in-take levels, poor drainage, overflows and overwatering. The system in the Tustin Ranch Golf Course helps eliminate water loss by hydraulically monitoring flows of reclaimed water that is stored in lakes which are lined to prevent seepage, he said.

"The system is extremely efficient because the only way water is lost is through evaporation," explained Robinson. When fully operational, the golf course irrigation system will in-take a continual flow of reclaimed water from two large reservoirs at the Michelson Reclamation Water Plant in Irvine each day for nine hours, according to John Economides, senior engineer at the Irvine Water District

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When you add it all up, is there really any other choice in grub control?

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CHIPCO SEVIN is a registered trademark of Rhone-Poulenc for carbaryl insecticide.

who helped plan the system. During this nine-hour period, as much as 1,000 gallons per minute will be piped into the lakes. Once in the lakes, water will be pumped into the sprinkler system and will then be used to water grass, trees and natural foliage throughout the area.

Though this reclaimed water is purified, regulations prevent it from being used as drinking water, Economides said. During the 15 hours that the system is not irrigating, water flows back into the lakes, a process which keeps debris such as dust and fallen leaves from stagnating in the water.

> *"The course's reservoirs help alleviate some of our difficulties in serving the public during peak demand periods."*
>
> *-John Economides*

According to Economides, this refilling process also helps relieve the strain on the water company. "The course's reservoirs help alleviate some of our difficulties in serving the public during peak demand periods," said Economides. "Because the course has a large water storage capacity, we can decrease the strain on the community's waterlines by redirecting the main flow to meet needs in other parts of the local area."

Keeping water clean

To maintain the purity and luster of the waterscapes, the course's in-take system includes hydraulic jets that propel water up to the top of waterfalls where it cascades slowly down to the lakes and is then recycled back into the jets. This hydraulic system is also used within the lakes to force movement in the water and to provide an ozonization treatment, a process that helps keep the water clear, bacteria- and algae-free.

Although water conservation is of utmost importance, the Tustin Ranch course's water elements have also been developed to reflect the beauty and spirit of the local community and to provide the ambiance of an upscale, top-quality golf course, according to Jim Colbert, head of Jim Colbert Golf Inc., Las Vegas, the company that is overseeing construction of the course and will manage it once it's completed.

"The challenge of the Tustin Ranch project has been to blend a water-saving irrigation system with a well-designed, attractive series of water hazards," said Colbert, who has helped formulate several professional Golf Association Clubs along with providing commentary for ESPN's live golf tournaments.

"What we've nearly finished creating is a handsome, manicured lake and water conservation system that imparts the feeling of a world-class golf course that offers area residents a quality club where they can enjoy their leisure time."

Scheduled for completion this summer, the 160-acre course will include a clubhouse, driving range, putting green and other related facilities. The course is the first of several golf courses planned by The Irvine Company in new residential communities in Laguna Canyon, Orange and along the Irvine Coast. The course will complement the Tustin Ranch, a 1,740-acre community along the eastern border of the city of Tustin. **LM**

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Model 65 PTO-powered 5' width

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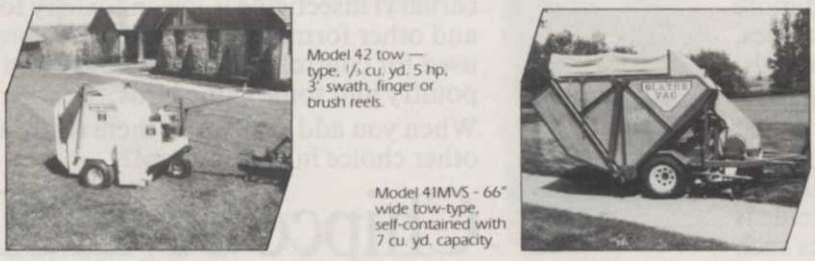
Model 166hl 5' width, 8 1/2' lift



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New amine-compatible iron greens up turf in less than 48 hours.

Prosperity resolution for 1989: Use FeRROMEC® AC (amine-compatible) in your lawn-care program. Green up your world and green up your wallet ... get a Roll-X™ Measuring Wheel in the bargain.

Everett Mealman, President
PBI/Gordon Corporation

Ferromec liquid sprayable iron can produce a deep, vibrant, emerald-green color in ornamental turfgrass very, very rapidly . . . and very, very economically. In most instances, it can achieve this miracle in less than 48 hours, at a cost of about $1.70 for a 6,000 sq. ft. lawn.

. . . But, wait! That's only part of the good news about Ferromec. Equally important is the fact that Ferromec does not produce a lot of rapid top growth that requires hours of expensive, unwanted time on the business end of a mowing machine, plus exposure to disease that so often results from abnormal growth caused by using excessive amounts of expensive nitrogen out of season to generate the green color of the grass.

And there's still more good news!

Nitrogen will eventually produce a green color, but excess nitrogen plus turfgrass equals hay. Obviously, Ferromec is a better way!

Ferromec AC can be tank mixed with any TRIMEC® Herbicide formulation, so it gets a free ride. And guess what else. The Ferromec actually speeds up the activity of the Trimec!

Indeed Ferromec is unique. There's absolutely nothing like it on the market.

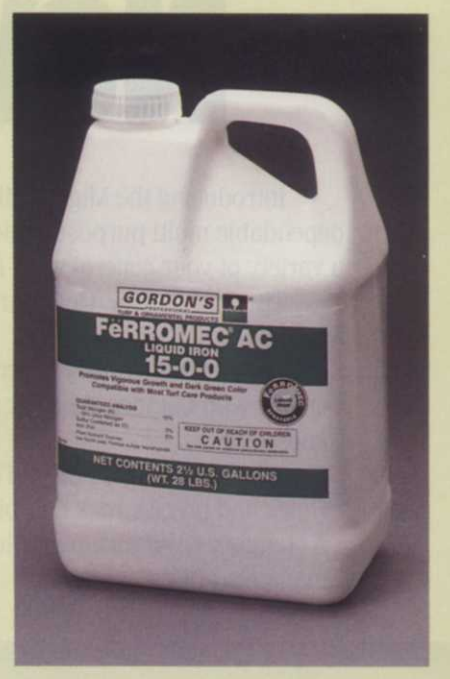
No wonder literally thousands of lawn-care operators, landscape managers and golf-course superintendents are now using Ferromec in their turf-care programs.

The importance of color

Perhaps George Toma best summarized the case for Ferromec when he said, "We spend untold time and effort preparing the playing field of the Super Bowl so the turf will hold up under the battering it takes . . . But do you know what it is we hear about? We hear about that beautiful green color we get from Ferromec!"

Color is so important! You give a homeowner a brilliant green lawn, and give it to him fast, and you've got a happy customer who will recommend you to his friends.

Surely you'll want to try some Ferromec in 1989. To help you make that decision, we're offering you a chance to order a $60 value



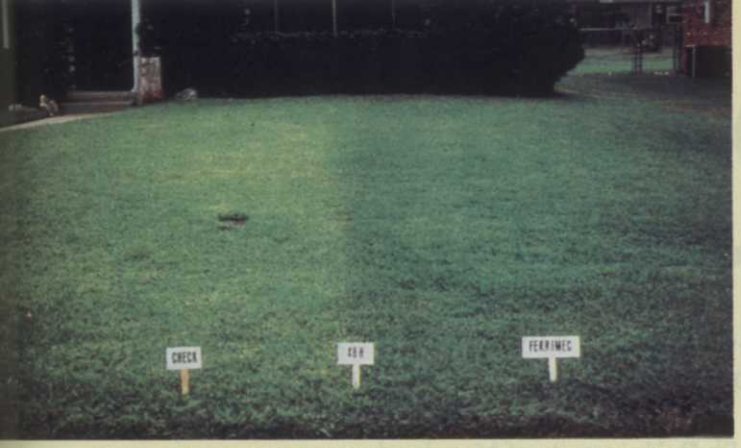
Roll-X™ Measuring Wheel for only $20 when you buy five gallons of Ferromec AC. (You'll need an extra wheel to measure all the new lawns you'll be invited to bid on when your customers tell their friends about your work.)

Meantime, you might like to review some of the facts about iron, which will help you understand how Ferromec works, and why no other company can offer you a product like our patented Ferromec sprayable iron.

Facts about iron that turf professionals need to remember.

First: Iron is essential for the synthesis of chlorophyl. No iron . . . no green.

Second: In most instances where ornamental turf is being grown there is not enough naturally occurring iron in a useable ferrous state to produce a vibrant green color. Accordingly, a chelated iron can be added to the soil.



St. Augustine grass lawn in Texas showing the darker color (right) produced by Ferromec Liquid Iron applied in early September at 8 oz./1,000 sq. ft. The green-up became visible within 2 hours and the darker color persisted until dormancy, a couple of months later, according to Wallace Menn of Bryan, Texas, a turfgrass specialist who conducted the test.

Half of this green at Hodge Park Golf Course in Kansas City was sprayed with Ferromec and, within 24 hours, the color change was dramatic. Under normal growing conditions, visual response usually occurs between 8 and 48 hours after application. Ferromec is also effective on trees, shrubs and herbaceous plantings.

Third: Chelated iron is primarily absorbed through the roots rather than by foliar activity. To get enough chelated iron into the grass through the roots to produce the desired color rapidly, it is necessary to speed up the growth by using nitrogen. This will eventually cause the grass to green up. But it will also bring on excessive growth that will cause unwanted mowing and exposure to disease.

FëRROMEC is different

Ferromec, on the other hand, is unique; and it works in a totally different way.

Ferromec is a patented process that involves bonding a ferrous iron molecule to a urea molecule. When sprayed on turf, Ferromec is ingested almost immediately via foliar intake at the point where chlorophyl is formed. Once inside the plant, the iron-urea molecular bond breaks apart because the plant has such a ravenous appetite for nitrogen.

The result is that the iron molecule in Ferromec goes to work almost immediately to create chlorophyl and, depending on the condition of the turf and the weather, green-up occurs any time within 8 to 48 hours *. . . without causing excessive growth.*

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Iron is a micronutrient essential for all plants, but the amount required can vary dramatically, depending on the kind of fertilizer used and the composition of the soil. Sometimes zinc and/or manganese are also required, so we have developed special formulations to cover such specific needs. For information relevant to your own situation, call us.

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1988 Super Bowl playing field at the Jack Murphy Stadium in San Diego received three applications of FERROMEC Liquid Iron along with Gordon's BOV-A-MURA® Organic Activator. Internationally known NFL turf consultant George Toma (right), pictured with son Chip, says the playing surface was sparsely covered with dormant Bermuda, including many areas of bare ground, and was seeded with turf-type ryegrass only 25 days prior to the game. "We couldn't have made it," says Toma, "without the root-building strength of BOV-A-MURA and the color enhancement of FERROMEC."

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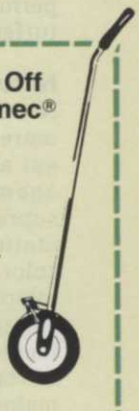

To receive via UPS your $60 value Roll-X™ Measuring Wheel with collapsible handle for only $20, send this coupon to PBI/Gordon Corporation with proof of purchase (a copy of invoice or sales ticket) showing you have purchased five gallons or more of Ferromec AC Liquid Iron between November 1, 1988 and October 31, 1989, when offer ends. Limit one per customer.

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712-1088

A GUIDE TO TURFGRASS FERTILIZATION

Many factors are involved in establishing and managing healthy turf. Overlook one, and you may be wasting your time with the rest.

by Thomas R. Turner, Ph.D, University of Maryland

Maintaining a quality turfgrass stand depends of a variety of management practices. The most critical are proper species and variety selection for the site, soil preparation, mowing, irrigation and fertility practices. Failure to seriously consider and properly implement any of these factors invariably leads to a decline in turfgrass performance and a rise in potential pest problems.

Some landscape managers, like lawn care operators, often have control only over the site's fertility. Thus, it becomes even more critical for these businesses to implement sound fertilizer programs that maximize the performance potential of an existing turfgrass stand.

Sod damaged two weeks after installation due to high soluble salts. When soil testing for new sites, obtaining a soulble salts test in addition to the regular test can prove very valuable.

Phosphorus deficiency on creeping bentgrass. The turf has thinned to a wilted, purplish appearance that could be mistaken for drought stress. This turf will green up slowly in the spring.

Nitrogen fertility

Nitrogen fertility has received far more attention than any other nutrient and more than most other management practices. This is not suprising. Nitrogen can have a dramatic impact on turfgrass growth, color, density, recuperative capacity, tolerances to environmental stresses, competitiveness against weeds, and incidence of diseases. Using a sound nitrogen fertility program can have a major beneficial impact on producing quality turf. But an unsound program can just as easily create major problems and result in the rapid deterioration of a stand.

Several factors must be considered when implementing a nitrogen program: turfgrass species, rate and time of application, geographic location, source of nitrogen, soil type, other management practices and special problems. All of these factors are interrelated and impact on the final nitrogen program devised. Consideration of only one or two of these factors in a program's development will generally result in less than satisfactory results.

Turfgrass species

Large differences exist among the turfgrass species in nitrogen rate re-

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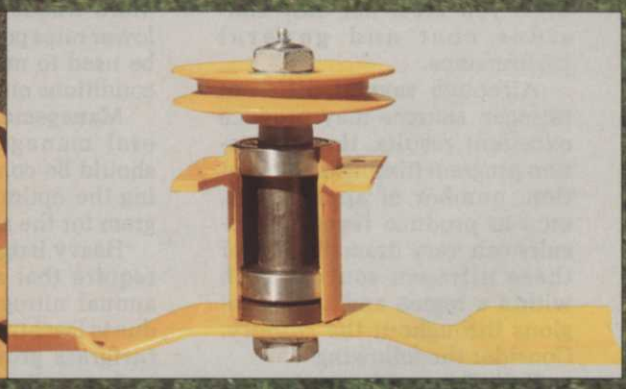

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quirements and optimum timing of application. The inability to correctly identify turfgrass species can lead to misapplications of nitrogen. What follows are numerous pest and environmental stress problems. The most common example would be differences in optimum timing of application for warm- versus cool-season grass species. Late spring through early fall is generally optimum for the former; late summer and fall generally being ideal for the latter.

Ideal rates of application vary tremendously among the species, even within the cool- and warm-season grass species. Thus, the first factor that must be considered in developing any program is the predominant (or desired) turfgrass species.

In a mixture of species, you can shift populations over a period of years towards a desired species simply by manipulating the nitrogen program.

Application rates

Over the years, standardized nitrogen application rates have become widespread for the different turfgrass species. They are commonly used without much thought. These standardized rates are an averaging of rates found to produce acceptable turf over a wide range of conditions.

For the good turfgrass manager however, these rates only provide a rough guideline. They must be adjusted, sometimes dramatically, for local conditions.

For example, turf grown on excessively sandy soils, particularly those that recieve heavy irrigation, may need more nitrogen than the standardized rates. Turf stands which are heavily used and need greater than normal recuperative rates, such as athletic fields, may also need more nitrogen. However, where limited budgets may restrict mowing to infrequent intervals, reduced nitrogen rates would be advisable to prevent too much tissue removal and potential turf scalping.

Application timing

Perhaps no greater mistake is made by homeowners than nitrogen applications during the wrong time of year. Unfortunately, this type of mistake is not limited to homeowners. It is commonly made by turfgrass professionals as well, often due to the economics and demands of business rather than to a lack of agronomic knowledge. The results in either case can be devastating.

A common example of the economics versus agronomics problem occurs in the spring fertilization of cool-season grasses in the transition zone. Spring applications in excess of 1 pound of nitrogen per 1,000 square feet can cause disease and summer stress problems in many situations. But the demand for increased dark green color (particularly in comparison to their neighbors) often leads to excessively high nitrogen rates for this time of the year. Turf loss or failures later in the year are often the result of this problem (although the reduced quality is usually blamed on other factors).

As the above example suggests, the problems of timing of application are usually related to the rate. Whereas small applications of nitrogen (1/8 to 1/4 pound per 1,000 square feet) usually cause no problem and are generally

Other factors to consider when selecting a nitrogen source

When choosing a nitrogen source, it is important to contact local turfgrass researchers and extension specialists. They can help determine which nitrogen sources have performed best in your geographic location. However, you must not only consider cost and general performance.

Although several different nitrogen sources may produce excellent results, the application program (timing of application, number of applications, etc.) to produce favorable results can vary dramatically for these nitrogen sources both within a region and among regions throughout the country. Consider the following:

Soil Type. The soil upon which turf is growing can substanially alter the nitrogen program needed to produce acceptable turf. Soil influences the breakdown rate of fertilizers, the leaching rate of nitrogen, and the growth rate of turfgrass and thus its annual nitrogen requirement.

The most obvious example is a soil containing substanial amounts of sand. The soil's retentive capacity for nitrogen is reduced and the leaching rate of nitrogen is increased. Thus, the annual nitrogen requirement is usually higher on these sites. More frequent applications at lower rates per application must be used to meet the needs and conditions on these soils.

Management practices. General management practices should be considered as affecting the optimum nitrogen program for the site.

Heavy irrigation will usually require that somewhat higher annual nitrogen rates be used due to leaching losses and higher turfgrass growth rates. When turfgrass clippings are removed, you are in effect also removing nitrogen from the site. Thus, annual nitrogen rates in the long term will need to be somewhat higher. Also, if pesticide applications are not available for a site or you are trying to minimize their use, it is important to adjust your nitrogen program, particularly timing of application. This will minimize potential disease and weed problems that regularly occur or can be expected to occur.

Special Problems. A good turfgrass manager will anticipate problems and will record problems that tend to reappear on a site on a regular basis. He then should adjust the nitrogen program accordingly to minimize these problems.

Diseases are typical of these recurring type problems. For example, if serious snow mold problems regularly occur on a turfgrass stand being maintained, late fall applications of nitrogen should probably be avoided, even though these applications are generally considered beneficial in most situations.

Another example is brown patch problems that recur every year on tall fescue or perennial ryegrass. Late spring applications of more than 1/2 lb. of nitrogen per 1,000 ft. should be avoided to help reduce the severity of disease incidence.

—*Tom Turner, Ph.D.* □

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MSMA without Lawn-Plex® *Unretouched Photo Taken 6/30/87 On Bermudagrass* MSMA tank mixed with Lawn-Plex®

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Phosphorus deficiency in seedling Kentucky bluegrass seven weeks after planting. Only the plot on left received phosphorus.

beneficial. Despite the timing of application, higher rates may be very beneficial at certain times of the year and detrimental at others.

Geographic location

As has been alluded to previously, geographic location greatly influences the nitrogen fertility program that is most desirable. For example:

1.) The predominant species and cultivars grown are basically determined by geographic location.

2.) The length of the growing season—which directly influences the annual nitrogen requirement of a particular grass—is determined by geographic location. Bermudagrass grown in Texas will likely have higher annual nitrogen requirements than Bermudagrass grown in Maryland due to the shorter growing season in Maryland.

3.) Soil types and rainfall rates, both of which influence leaching rates of nitrogen and turfgrass growth rates, vary with geographic location.

4.) The performance of different types of nitrogen sources depends on prevailing environmental conditions. Thus, nitrogen sources that are relatively inefficient in one part of the country may produce excellent results in another.

New nitrogen sources with varying response characteristics are continually being marketed. In fact, this development of a wide variety of nitrogen fertilizers has been the most exiciting change in the area of turfgrass fertility over the last 20 years.

Essential considerations

Often the first considerations given in selecting a nitrogen source are cost and whether to select a granular or sprayable material. The most important point to remember, however, is that whichever nitrogen source you choose, most can produce good turfgrass quality if you understand their individual characteristics and adjust your application programs accordingly. Following are brief descriptions of the characteristics of some of the more important materials used in the industry today:

Urea: one of—if not the most-commonly—used nitrogen sources in the industry today, primarily due to its low cost compared to other nitrogen sources and its solubility, which allows for liquid as well as granular applications. It is 100 percent water soluble, resulting in rapid turfgrass uptake and response. However, residual response (five to eight weeks) is generally shorter than most other turfgrass fertilizers.

Urea is converted to the ammonium ion (NH_4+) in the presence of the enzyme *urease*, which is rarely limlting in turfgrasss situations. The ammonium ion then undergoes *nitrification* by micro-organisms to form the nitrate ion (NO_3-), the primary form of plant uptake. Under high pH conditions, the NH_4+ may, however, combine with an hydroxyl ion to form ammonia gas, which will volatilize. Thus, urea should be avoided on high pH soils, near the time of lime applications, or in a tank solution of high pH.

The burn potential of urea is higher than most other nitrogen sources commonly used on turf, having a salt index of 1.62 (based on equal amount of plant nutrient applied). Ureaformaldehyde and isobutylidene diurea (IBDU) have salt indices around 0.20, while methylene urea, sulfur coated urea, and natural organics are about 0.86, 0.70, and 0.70, respectively. It would be advisable that when conditions are present which are conducive to fertilizer burn, i.e. dry soil and high temperatures, that nitrogen sources with a lower burn potential than urea be selected.

Urea does have a lower burn potential than some other soluble nitrogen sources, which is one of its advantages over these materials. Ammonium nitrate and ammonium sulfate, for example, have salt indices of about 3.18 and 3.25, respectively.

IBDU: has a low solubility in water as well as having relatively small amounts of free urea. Thus, it acts as a slow release fertilizer. Nitrogen becomes available as the product is hydrolyzed. Thus, the two most important factors that influence the release rate of nitrogen from IBDU are soil moisture levels and fertilizer particle size.

As soil moisture increases, so does nitrogen release from IBDU. This is an advantage under dry conditions when little nitrogen is needed by the turfgrass plant but can be a slight disadvantage under very wet conditions, where excessive growth may be stimulated at a time when mowing is already difficult. The release rate of nitrogen from IBDU also increases as its particle size decreases, since there is a greater surface area per unit of nitrogen for water to react with.

Past research has shown finer-sized IBDU to be more efficient in regards to turfgrass use, although it is generally more expensive. Temperature has less influence on nitrogen release from IBDU than most other nitrogen fertilizers. Thus, it has proven to be a superior cool weather performer and will give excellent winter color and early spring greenup.

Most IBDU fertilizer products sold now are mixed with varying amounts of urea or soluble nitrogen fertilizer. These products will give quicker initial response than 100 percent IBDU (which can be very slow due to its low soluble fraction) and will give a more uniform response throughout the season. The drawback is a shorter residual response.

Sulfur-coated urea: urea which has been coated with sulfur. As a result, the urea is protected from immediate solubilization and the product acts as a slow-release fertilizer. Several types of sulfur-coated ureas are available on the market but research has shown that they perform very similarly.

The advantage of the sulfur-coated ureas is that the nitrogen release rate is influenced less by soil conditions than most other slow-release fertilizers. Thus, turfgrass response to sulfur-coated urea in past research has

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shown it to be a superior performer and has tended to be more uniform throughout the year than other slow release fertilizers.

Research at the University of Maryland has also shown performance to be excellent under a wider range of timing of applications than most other nitrogen sources, making it more flexibile. Cost has also generally been lower than other slow release fertilizers that have not been mixed with urea.

The primary disadvantage of sulfur-coated urea is that it must be applied dry whereas finer grades of other slow-release materials can usually be adapted to spray programs.

Ureaformaldehyde-type: which are produced from the chemical combination of urea and formaldehyde. The charactersitics of the fertilizer produced are primarily determined by the ratio of urea to formaldehyde used during production. As the ratio of urea to formaldehyde decreases, longer-chained UF polymers are produced. As the polymer lengths and number of longer polymers increase, the slower the release of nitrogen.

The urea/formaldehyde ratio for some typical products are approximately 1.3:1, 1.8:1 and 1.8:1 for Nitroform, methylene urea, and flowable UF, respectively. As a result, only about 1/3 of the nitrogen in Nitroform is water soluble, compared to 2/3 and 4/5 for methylene urea and flowable UF, respectively. In addition, Nitroform contains a greater percentage of longer-chained polymers in the slow-release fraction than these other products, further increasing its residual activity.

The nitrogen in the slow-release fraction of UF fertilizers is released primarily through soil microbial activity. Thus, any factor affecting microbial activity, such as soil temperature, moisture, pH and aeration, also affects the rate of nitrogen release from UF. As conditions become less favorable for microbial activity, nitrogen will be released from UF at a slower rate. Since environmental conditions that favor microbial activity are similar to those favoring turfgrass growth, nitrogen release from the slow release fraction of UF should occur at rates similar to turfgrass requirements.

There are two exceptions to this principle, however. In early spring, when cooler soil temperatures exist, a lag time exists between initial turfgrass growth. Thus, nitrogen is released from UF due to reduced microbial activity. Early spring greening (and cool weather response in general) is poorer when UF with high percentages of slow-release nitrogen are used compared to most other fertilizers. Also, during very warm weather, nitrogen release could at times be greater than is needed for growth of cool-season turfgrass species in the transiton zone.

Another potential problem exists when UF with high percentages of slow-release nitrogen is used on all sand putting greens or athletic fields (particularly if the mix was sterilized or fumigated). Microbial activity could be very low under these conditions and nitrogen release from UF would thus be minimal. This potential problem would be greatest in the first year or two after construction.

Response to the UF products in general improve with continued use over a period of years, regardless of soil conditons.

Organics: particularly activated sewage sludges, have been used as turfgrass fertilizers for more than 50 years. The primary means of nitrogen release is through microbial activity. Thus, response patterns would generally be expected to be similar to UF

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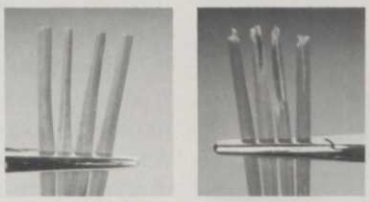

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products, although residual activity is shorter.

As with UF products, any soil condition adversely affecting soil microbial populations may reduce nitrogen availability to the turfgrass plant. In Maryland research, response to activated sewage sludge has been acceptable but generally not as good as most other nitrogen sources. Their low percentages of nitrogen (typically six percent or less) and high relative cost are also drawbacks. If you are interested in a purely "organic" nitrogen source for use on turfgrass site, however, they can be used successfully.

P and K

Phosphorus and potassium are essential nutrients provided by the soil. They play a variety of roles in the life and health of the turfgrass plant. The response of turfgrass plants to applications of phosphorus and potassium to soils deficient in these nutrients is not as dramatic as for nitrogen fertilization. But many weed, disease, and stress-related problems may be less critical if deficiencies are avoided.

Phosphorus is especially critical in turf establishment. Its deficiency can lead to a very thin, weak turfgrass stand that is easily overtaken by weeds. Several research studies have addressed the effects of phosphorus on turfgrass establishment. In one such study on a phosphorus-deficient soil seeded with Kentucky bluegrass/perennial ryegrass and Kentucky bluegrass/fine fescue mixtures, seedling growth and density was increased by seedbed phosphorus applications up to about seven pounds per 1,000 ft.

P and K are essential turf nutrients.

Typically, a new seeding on a phosphorus-deficient soil may look good for five or six weeks and then begins to thin and decline. This is due to the exhaustion at this point of seed phosphorus and the development of a plant deficiency due to a lack of soil phosphorus.

Importantly for those interested in reducing pesticide use, crabgrass encroachment into this area decreased dramatically with increasing phosphorus. This undoubtedly was due to a denser turf which minimized crabgrass germination and seedling survival.

Dandelion encroachment in a similar study on Kentucky bluegrass was greatly reduced where phosphorus was added to the seedbed 10 years before the actually measuring this weed's encroachment into the site. This response shows the long-term effect that proper seedbed fertility may have on a future pest problem.

Greening it up

Another quality factor that phosphorus influences is spring green-up. Turf failure to adequately grow and turn green in late winter and early spring has often been shown to be related to deficient soil phosphorus. It can easily be corrected with phosphorus applications. This delayed growth and greenup may be by as much as four to five weeks compared to similar areas nearby which have enough soil phosphorus.

As with limestone and potassium, the amount of phosphorus that should be applied to a site should be determined by a soil test. A particular soil may already be high in phosphorus and potassium and require no additional applications of these nutrients to grow quality turf. Or it may be extremely deficient and require abnormally large applications. Only after a

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Top row: *Leaf-feeding caterpillar, Mealy bug, Japanese beetle, Bagworm, Gypsy moth.* Bottom row: *Cankerworm, Leaf skeletonizer, Tent caterpillar, Webworm.*

thorough soil test can you know for certain.

However, in situations where you may not have had time to obtain a soil test, a general guideline for phosphorus application rates would be 4.0 pounds per 1,000 ft. tilled in to a four- to six-inch depth for establishment, and 1.0 pounds per 1,000 ft. for annual maintenance applications.

Potassium, although not especially critical during the establishment of turfgrass in most situations, is very important for the maintenance of an existing stand. Its most important role may be in the improvement of a turfgrass stands' tolerance to environmental stresses such as heat, drought, or cold.

Improved tolerance

Cool-season grass tolerance to heat and drought stresses is generally improved with adequate levels of soil potassium. Warm-season grass tolerance to cold stress is usually improved with adequate potassium. Applications of one to two pounds of potassium per 1,000 ft. in spring or late summer to cool- or warm-season grasses, respectively, can help improve tolerance to these environmental stresses. Sites which are very sandy, which are heavily irrigated, and/or have clippings removed (such as putting greens) may need more potassium.

The ability of turf to withstand wear such as might be encountered on athletic fields or golf courses has also been related to increased soil potassium levels. Thus, on sites where abnormal human or equipment traffic is common, maintaining medium-to-high soil potassium levels becomes more critical.

More potassium means better wear.

These improvements in both environmental and wear stress tolerances due to sufficient potassium result in a healthier, more vigorous turfgrass stand. These stands will thus usually have fewer pest problems and, when they are attacked by pests, will often exhibit less damage and will recover more rapidly from any damage that might occur.

For those interested in an integrated pest management program, it is certainly important to not only initiate a sound nitrogen fertilizer program, but also to make sure that soil levels of both potassium and phosphorus are maintained.

Soluble salts

Although not a typical soil fertility issue, an important test for soluble salts can be run by soil testing laboratories. This test can be particularly valuable in coastal areas where soil soluble salt levels may be high, but can also be valuable in diagnosing over-application or spill problems.

These high salt levels may be in dredge soils being used as "topsoil," may be due to salt spills or movement of salt from roads or driveways, or due to excessive fertilizer applications.

No matter what the reason, much effort and money could have been saved by turf managers trying to re-establish these areas if a soluble salts test had been run first. It is prudent that on any major site that is being established, particularly if topsoil has been brought from another location that soluble salts and regular soil tests be taken.

You may save yourself a substanial amount of money, as well as protecting your professional reputation, by doing so. **LM**

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DOING IT THE ENVIRONMENTAL WAY

Environmental Landscape Service's Charlie Racusin can't get bogged down in details. He's too busy keeping his Texas customers happy.

by Will Perry, managing editor

Somewhere in Charlie Racusin's office, in a Formica frame, there's a chart that tells you a lot about the man who works there. The chart is from a company that performs personality testing, and its colors represent a subject's strengths and weaknesses in the business environment.

Charlie's chart shows a lot of red, which means he's an aggressive, take-charge type of guy; a lot of blue, which means he's resourceful and analytical; and yellow, which means he's a good communicator, he's flexible. But as for green, well, that's not one of his bigger colors.

We're looking over his chart when Racusin says: "See my red, I'm a killer red. And I'm a killer blue. In other words, I'm a fast-paced guy. I'm not as mellow and relaxed as most people in our organization are. Green represents people who are good with details," adds Racusin. "I'm not a guy who likes to get involved in details. We hire people to do that."

So begins an interview where I'm supposed to uncover the details that make Racusin's Environmental Landscape Services one of Texas' most successful commercial landscape design and management firms. I found out early that I'm not going to be able to write about the types of trees Racusin prefers and why, or about his hiring practices, his equipment, or preferred chemical applications. I did however, find out what makes this company tick. Charlie Racusin and his hand-picked team.

Philosophically speaking

Racusin, 42, is a shining example of a guy who saw an opportunity in the great American marketplace, grabbed it, and profited handsomely. His business philosophy is somewhat simple: work hard, place quality before quantity and treat your customers and employees with the utmost respect and consideration. Follow that formula, he believes, and success is sure to follow.

Charlie Racusin formed the company 17 years ago after a brief stint in the property management field. It was then that he saw the need for a high quality, professional organization to service the Lone Star state's booming commercial landscape market.

"Often in the past, what I found was that there were people who told you they were going to be there tomorrow—but they didn't show up, they didn't call, they didn't give any reason why they weren't there," recalls Racusin. "We brought to this area a business that would back up and deliver what it said it was going to. That's where we started and began to build—on that rather simple premise of doing what we said we were going to do."

The word that most often pops up when Racusin talks about his company is "quality." Quality work, quality employees: the two key elements in Environmental's success.

He believes in hiring good people and letting them know they're an integral part of the organization. That's done in a variety of ways. The first step is the personality review. For the past six years all of his company's potential employees undergo personality evaluation, the results of which affect Racusin's hiring decision. Since its institution, Racusin says the company has made better hiring decisions and reduced turnover.

Dealing with people

"The reason this system is so valuable is that in building a business you're dependent on managing and developing a team of personnel. That team has to be cohesive, or you've got people fighting with each other. More importantly, from a managerial standpoint, if I'm dealing with you then I've got to know what you're all about," says Racusin.

"You can never be complacent," says Charlie Racusin, owner of Environmental Landscape Services. "I wake up every morning and hit the ground running.

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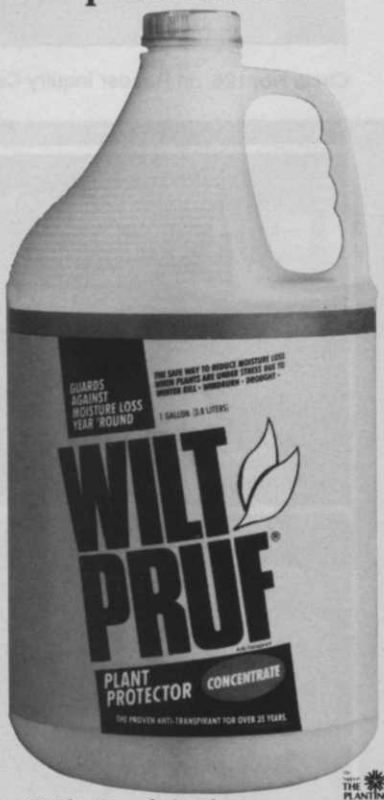

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Racusin is proud of the fact that his employees tend to stay with his company for years- a phenomena not easily accomplished in the Southwest's competitive landscape market. Why do they stay? In terms of pay levels, Racusin says that, even though his company offers as much or more than anyone else in the industry, "I don't think compensation in terms of pay is the highest priority to an employee. I think," he continues, "the feeling, the environment that you create in your company among your personnel is the most important element to gaining the tenure you're seeking from these people."

Racusin does several things to create a comfortable work environment. There's the profit-sharing and pension trust plan, which grows annually as company profits are poured in. The program has allowed employees to sock away a very handsome nest egg since being hired.

In the hallway outside Racusin's office, just past the conference room with the 21 Texas Association of Landscape Contractors' and eight national awards on the wall, is the "Achievement Bell." Any of the office personnel can sound it off after doing something they're particularly proud of.

There's also the Foundation of Excellence Award, presented for the first time to two employees last year at an annual company-wide dinner. A granite tablet holding the winner's signature, handprints and the date is laid to rest outside the entrance to the company's Houston field office, where it will remain forever. Last year's winners were the subject of a 10-minute video that showed them at work and at home with the family. The soundtrack? Carly Simon's *Nobody Does It Better*, of course.

"Employees need to feel that they're appreciated and cared about just as much as your clients do," says Racusin, who strives to maintain a family atmosphere in his organization of 150 employees working in Houston and Austin. He does so by gathering the company employees together at family functions such as picnics, Christmas parties and awards banquets. "I think you'll find that if you do these things your employees will develop a sense of well-being and cohesiveness as a group."

In no hurry

Another point of pride with Racusin is the company's slow, yet steady growth pace. Most of Environmental's present customers have been with the company for years, and about 90 percent have come through referral. "We've never really tried to sell quantity," says Racusin. "What we've always done is try to maintain a consistency in our quality of work. We grow gradually and monitor the amount of productivity people are capable of putting out. That ensures the fact that we can deliver what we say we're going to deliver. If you do that, then you will grow."

What is delivered to the people of Houston and Austin is exquisitely-managed properties. They see dependability, trust and a team of professionals willing to go the extra mile for them.

Perhaps this is demonstrated best when the area is battered by the numerous tropical storms and hurricanes that have called Houston home over the years. Take Alicia, 1983, modestly referred to by Racusin as a "significant storm," which tore the more significant roof off his Houston operations office.

"We still had to get to our clients," remembers Racusin, who dispatched a task force with extra chain saws, tree guides and staking materials. "We made it a point to get to these properties within a day or two after the roads were passable." His company's efforts paid off: crews saved hundreds of trees.

Since that time, all threatening storms are tracked by weatherband radio, says Racusin. Environmental customers have the home phone and beeper numbers of key personnel and are told that someone will be on their property as soon as roads are passable.

After the storm, an immediate inventory by Environmental's personnel is underway to determine where the company's services are needed most. They then attend to those properties in order of importance. No, the attention doesn't cost the customer more than their annual management fee.

Charlie Racusin is a businessman who has matured in step with the high-budget commercial landscaping market, which is why his marketing analysis, simple as it may be, is so intriguing:

"People know when you're doing good work. It's a commodity, it's there, people can see it. They can see how you and your personnel project themselves. We've grown gradually because we've never forced our growth. It's key in our opinion to be known for what we're all about: a company performing the highest quality work. To do that you have to have a fix on your quality. It only takes one black mark and you could be in trouble."

Obviously, black is not one of Charlie's stronger colors either. **LM**

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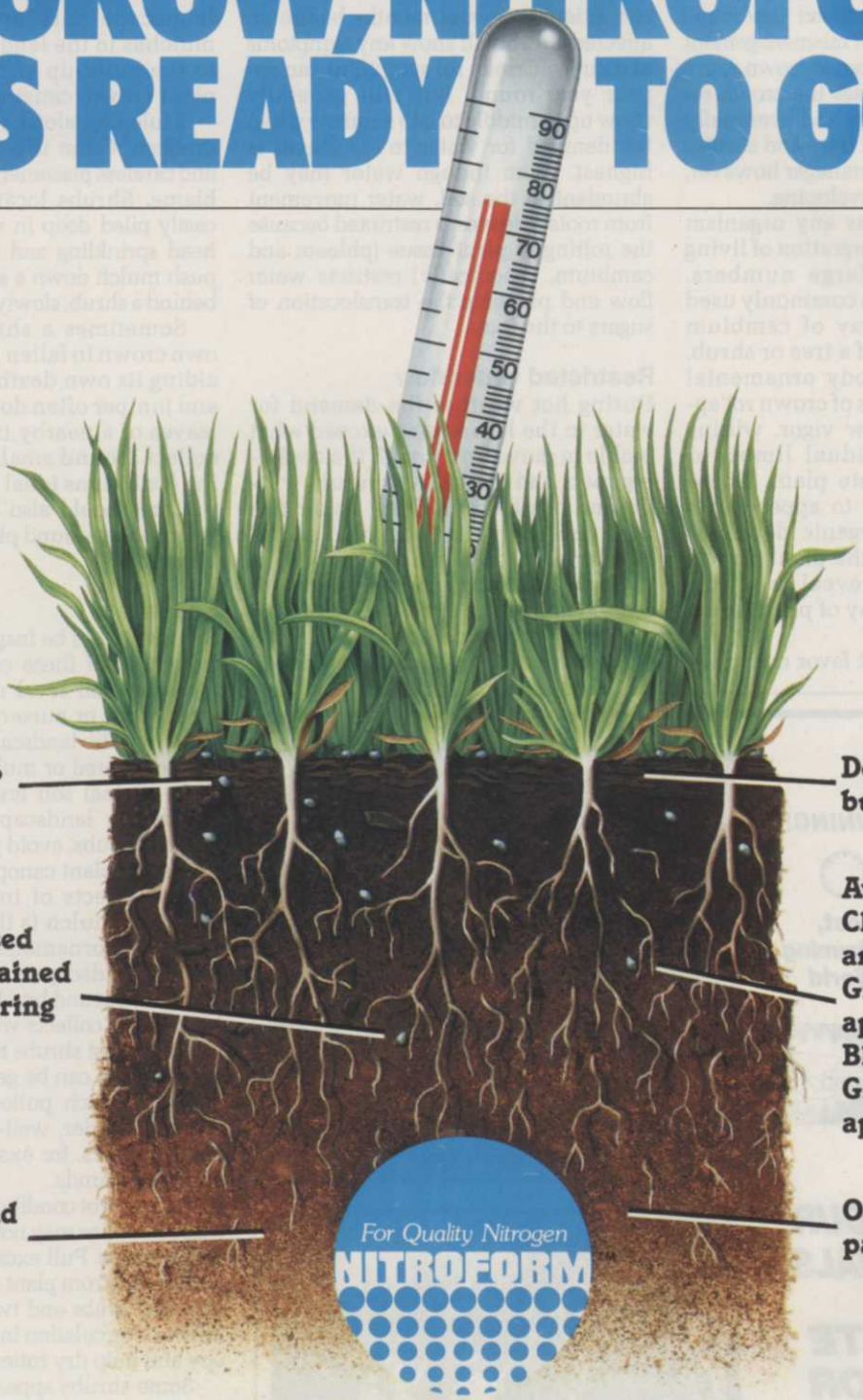

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Avoid crown rot by using mulch properly

by George Scott, pres., symbiosis

Landscapers using chipped landscape bark should realize that mismanagement of organic mulch can cause crown rot.

This condition causes the crown region of a plant to decay and eventually kills many ornamental trees and shrubs. The astute landscape manager however, can prevent it from developing.

A rot is defined as any organism that causes the disintegration of living cells of plants in large numbers. "Crown rot" is a term commonly used to describe the decay of cambium tissue in the crown of a tree or shrub.

With several woody ornamental shrubs, the symptoms of crown rot appear as chlorosis, low vigor, wilting and death of individual limbs, or death of the complete plant. These symptoms are likely to appear after excessive mulch, organic debris or soil collects around the plant crown. Investigation may reveal swelling, splitting and the decay of plant tissue in the crown area.

The conditions that favor crown rot can exist for several months before an affected shrub will show any symptoms of distress. Crown rot symptoms can appear year-round, but will generally show up in middle to late summer when the demand for water to the leaves is highest. Even though water may be abundant in the soil, water movement from roots to leaves is restricted because the rotting of plant tissue (phloem and cambium, specifically) restricts water flow and prevents the translocation of sugars to the roots.

Restricted water flow

During hot weather the demand for water in the leaves may exceed what is able to move up through the declining roots and crown. As a result, wilting and death occur. Once a stem has been girdled by crown rot, that particular limb will die.

High humidity and temperature around the plant's crown also make an ideal environment for crown rot's development. In addition, adding landscape bark and other organic mulches to the landscape tend to add to the build-up of mulch within the plant crown, causing it to rot.

Mulching alone will not create the problem. Often it is the indiscriminate and careless placement of mulch that is to blame. Shrubs located on slopes are easily piled deep in mulch. Rain, overhead sprinkling and foot traffic tend to push mulch down a slope where it piles behind a shrub, slowly burying its crown.

Sometimes a shrub will bury its own crown in fallen leaves or needles, aiding its own death. Heather, azalea and juniper often do this. Also, falling leaves of a nearby tree or shrub may collect around smaller shrubs, creating conditions ideal for crown rot.

Care should also be taken to avoid water pools around plant crowns during irrigation.

Soil levels

Shrubs should be inspected regularly to free them of these conditions. Ideally, the same soil level maintained in the greenhouse or nursery should be maintained on the landscape. Shrubs should not be planted or mulched deeper than their original soil level. When putting down new landscape bark or mulch around shrubs, avoid placing it under or inside the plant canopy.

The effects of improper planting and deep mulch is the primary cause of death to ornamental shrubs on residential landscapes.

Clean out and brush away organic debris after it collects within a shrub canopy. For most shrubs this is an easy task. Lower limbs can be gently pushed aside and the mulch pulled away from the crown. In older, well-established shrub beds (junipers, for example) this isn't as easy as it sounds.

If crown rot conditions exist on a landscape it may or may not be too late to save some shrubs. Pull excess mulch and leaf mold away from plant crowns and prune out dead limbs and twigs. This will improve air circulation inside the plant canopy and help dry rotted tissue.

Some shrubs appear to be more susceptible to crown rot than others. These include azalea, euonymus, heather, juniper and rhododendron. Crown rot in ornamental shrubs is both caused and prevented by a simple cultural practice: mulching. By making periodic checks of the area and properly placing mulch, you will maintain healthy, long-lived shrubs. **LM**

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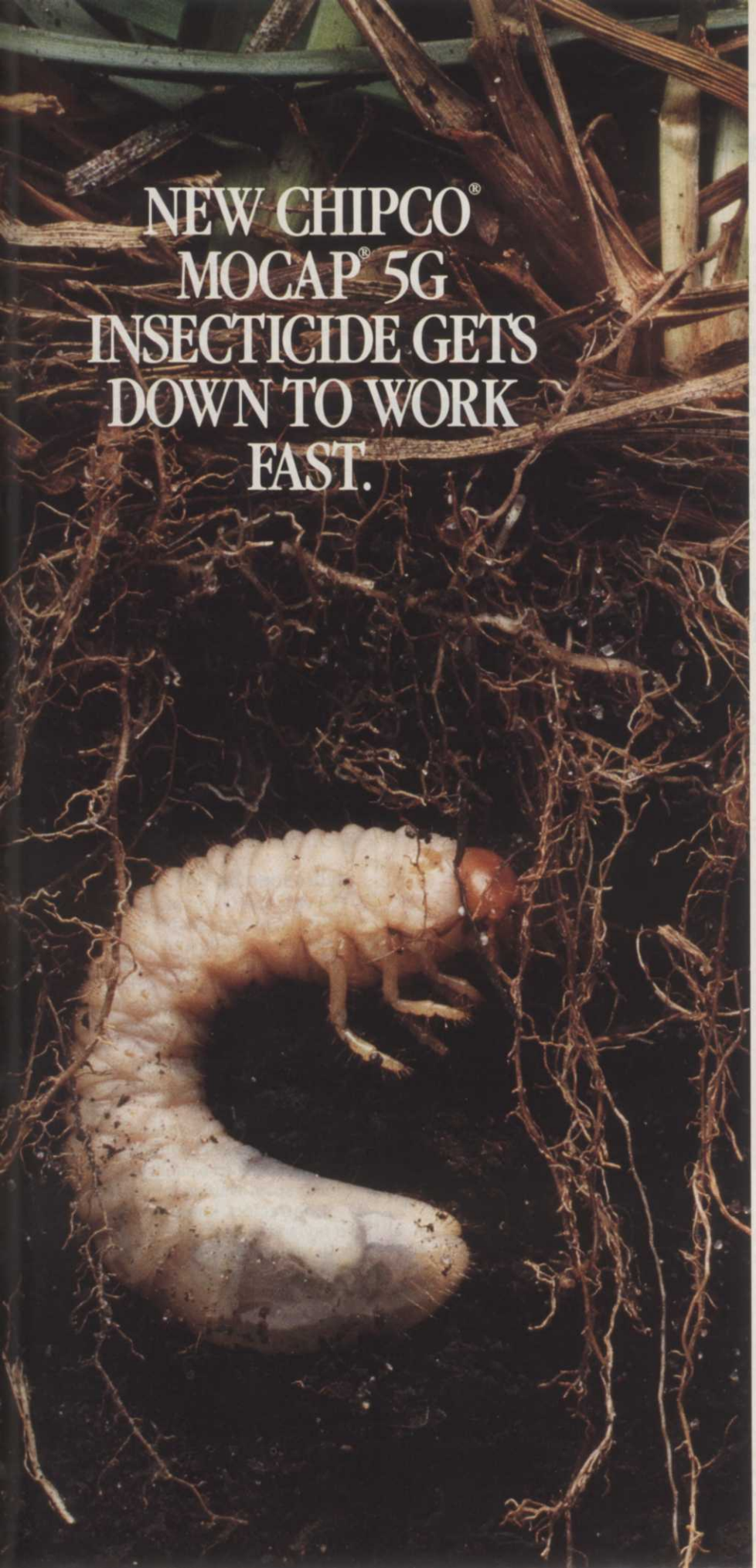

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Polymers make life easier for turf managers

by Bill Stinson, Aglukon, Inc.

The early-morning sight of a beautifully-kept golf course can be breathtakng. The contrasting green colors of its fairways, greens and tees and its carefully chosen trees and shrubs do not, however, tell the whole story. The golf course superintendent must painstakingly plan, coordinate and take care of endless details every day to make sure that his turf and course will meet high expectations.

The superintendent deserves a lot of credit for maintaining such good looking grounds, which in turn keeps club members happy and management successful. He knows though, that beautiful turf and grounds don't just happen. He makes it happen by choosing the right people for his team, the right equipment, the correct seed and chemicals and the best irrigation program.

Meeting the challenge

The ability to foresee possible problems and keep turf in useable condition is a challenge. That's why the turf manager of today is using more sophisticated tools, more scientific chemicals, better seed varieties and more modern irrigation systems. These advances in the green industry represent a concerted effort to help the landscape manager enjoy a better return on his efforts.

Polymers allow superintendents to reduce irrigation frequency and water stress to turf.

Such an addition to his arsenal can be Viterra Gelscape or other water-absorbent polymers.

Over the years, these products have become a trusted friend of the turf manager who is seeking consistent, more uniform germination and faster turf establishment with less maintenance and better durability and appearance. The ability of these polymers to absorb hundreds of times their weight in water—to be released as needed later—has given the turf manager the opportunity to reduce irrigation frequency and eliminate turf water stress on high or exposed greens. They also help the plant better use ground-applied fertilizer and chemicals.

Easy-to-use polymers like Viterra, applied as a blend with seed during aerification or verticutting, encourage strong, healthy root and blade development on hard-to-maintain areas. This takes at least some of the pressure off the turf manager, who strives to maintain beautiful, playable grounds at all times.

Hydroseeding turf

The very special characteristics of polymers that provide proper and consistent moisture to seeds and their ability to absorb, retain and re-release fluids many times over, was discovered by hydroseeders. Hydroseeding contractors now recognize how essential these products are for their operation; they have been able to reduce or eliminate costly call-backs caused in the past by a lack of germination.

Turf managers have seen their downtime due to clogged equipment reduced and, because turf establishes faster, less time is spent waiting for payment.

Contractors know how and when to lay sod. They also know that poor soils and a lack of proper irrigation will result in costly call backs for the replacement of "browned" areas. Polymers, applied at the time of soil preparation, give the landscaper an edge for quicker, better survival of their sod, faster knitting and decreased call-backs. Consequently, they can finish their jobs successfully by ensuring that the expensive trees and shrubs they plant will survive and withstand the harsh summer and winter temperatures. **LM**

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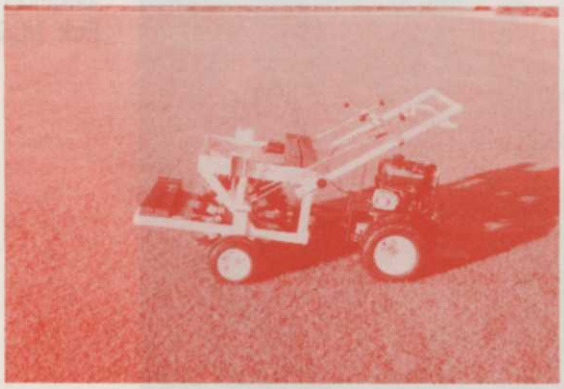

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Give grubs an inch and they'll take a whole yard.

Grubs feed at many levels in a yard, but it's at 1" to 1½" below the surface where they do their real damage. And because grubs are constantly moving from one level in the soil to the next, a single treatment of most insecticides will only get the ones closest to the surface.

But with OFTANOL® insecticide, you have the strength to knock out those grubs closest to the surface now, and the staying power to deal with grubs, rising up from the depths, in the future.

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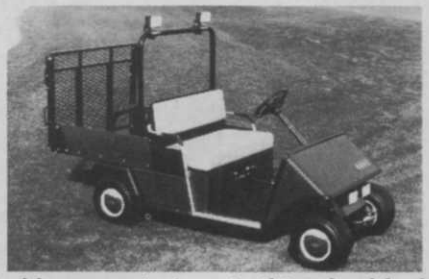
Circle No. 153 on Reader Inquiry Card

E-Z-GO Utility vehicle carries 1000 lbs

The new GXT-800 Turf Utility Vehicle from E-Z-Go Textron is a gas powered four wheeler with a 1000-lbs. payload capacity and an 8 cubic foot load bed. Dimensions of the bed are 44IM £M 40IM £M 8IM.

The GXT-800 features a new high output helical axle powertrain with a 244-cc, 2-cycle air-cooled engine and fully automatic, continuously variable transmission. A tilting load bed provides easy access for service. Auto-adjusting service brakes and "the industry's only self-compensating hill brake" reduce maintenance.



E-Z-Go offers a complete line of gasoline and electric powered turf utility vehicles with payload capacities of up to 1,500 pounds, including the new GXT-1500.

Circle No. 201 on Reader Inquiry Card

Three- and four-wheelers from Melex

The Melex utility vehicles are available as four-passenger personnel carriers, or as cargo carriers with wood or steel sides or steel platform.

All are equipped with three or four wheels, are electric, quiet and very maneuverable.

Circle No. 202 on Reader Inquiry Card

Dual rear disc brakes one of many features

The model B 2-70 from Taylor-Dunn features the industry's first standard dual rear wheel hydraulic disc brakes. The personnel/burden carrier has an all-welded 16-gauge diamond plate steel body unitized to a dual C-channel frame.

An automotive differential direct-drive axle is responsive and dependable. The unit has a short turning radius, in-dash controls and automotive steering for maneuverability. The modular design of the B 2-70 aids in converting the carrier with bolt-on toolbox doors, extra seats, or hitches. The model B 2-70 carrier will transport passengers, equipment or heavy loads safely and reliably.

Circle No. 203 on Reader Inquiry Card

M-B Company pulls up in the GSV-1

The GSV-1 is a new bi-directional utility vehicle for numerous road maintenance and land development applications. According to M-B Company's Ground Service Vehicle Division, the "swing seat" enables the operator to turn the entire seat and control console, thereby always facing the work being done. The console is attached to the seat's arm rest, allowing for one-hand operation of transmission, attachments and accessories.

Circle No. 204 on Reader Inquiry Card

Club Car's vehicle line is versatile

A full array of vehicles in the Club Car utility vehicle line suits most terrain and maintenance challenges.

The Carryall II is a gasoline model powered by an exclusive four cycle/341cc engine, with large durable double-walled aluminum pickup bed.

The Carryall I is available in both gas and electric models, and features an all aluminum frame, chassis and pickup bed, a thermoset polymer front cowl, integrated front bumper and side rub rails. Inner fenders are flange-sealed to protect the battery and four cycle/341cc engine from dirt. Battery rating for the Club Car Carryall I is 105 minutes.

Circle No. 205 on Reader Inquiry Card

Hahn Maxi Pro 435 with hydrostatic drive

The hydrostatic drive on the new Hahn utility vehicle is powered by a 35-hp Wisconsin engine. A low center of gravity and sharp turning radius allow this unit to be used in numerous applications. The Maxi Pro is capable of carrying 300 gallons of spray material. Several other attachments will be available soon.

Circle No. 206 on Reader Inquiry Card

Mighty Mits Line breaks into market

Mitsubishi Motor Sales of America has entered the multi-purpose utility vehicle market with its Mighty Mits line of industrial vehicles.

Designed to suit a wide variety of

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Circle No. 122 on Reader Inquiry Card

Only Rubigan® spans the patch disease spectrum.

work assignments in golf courses, parks, groundskeeping, facilities management and maintenance applications, the line features a unique raised roof which allows for more headroom than similar multi-purpose vehicles designed for use off public roads.

The Mighty Mits come in full cab models equipped with either sidebars

or doors, Flo-Thru and Tilt-Bed models, with two- or four-wheel-drive options. Maximum payload capacity is 1,750 pounds.

Circle No. 207 on Reader Inquiry Card

Two from Cushman are liquid-cooled

Cushman offers the green industry

two new utility vehicles with liquid-cooled engines.

The "Turf-Truckster" vehicles have OHC gas engines that develop 26 hp at 3,600 rpm. Cushman engineers believe the three-cylinder, liquid cooled engines offer increased performance, quieter operation and extended service life.

The Model 630 is a three-wheeler. The Model 632 has four wheels. Both have a rated capacity of 1,900 lbs.

Cushman reports the new models are vastly improved, featuring a higher capacity, automotive type clutch, automatic choke, an improved heater/defroster with high-output heater, more foot room and a redesigned dash/instrument panel.

An optional live hydraulic system includes a remote hydraulic capability for operating attached equipment. Many attachments and accessories are available.

Circle No. 208 on Reader Inquiry Card

ProHauler tires easy on the turf

Yamaha's new ProHauler features tires designed to protect delicate or expensive turf from unnecessary damage.

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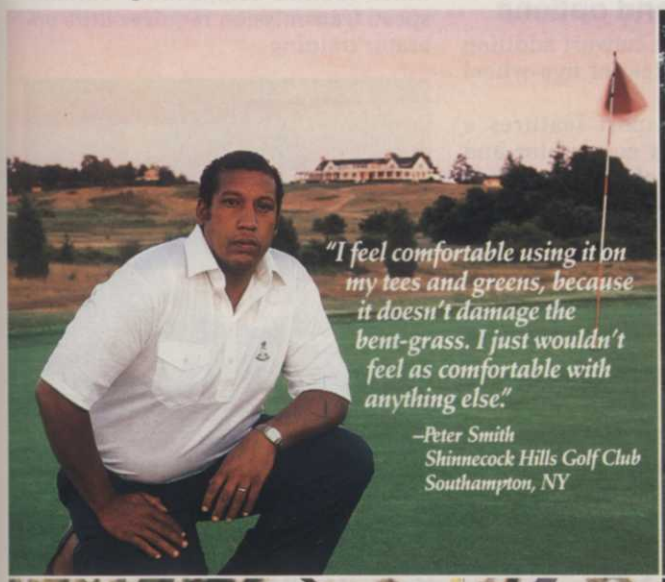
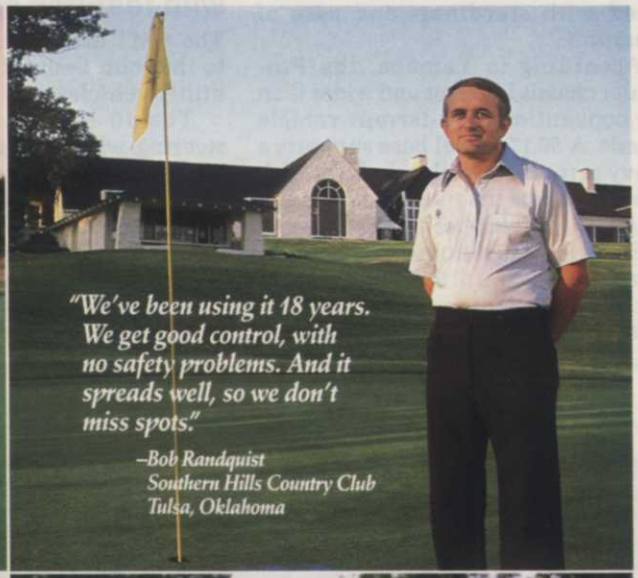
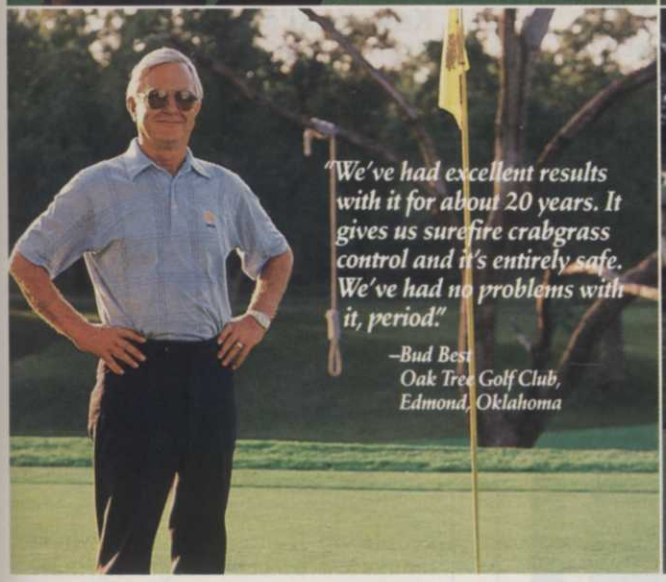
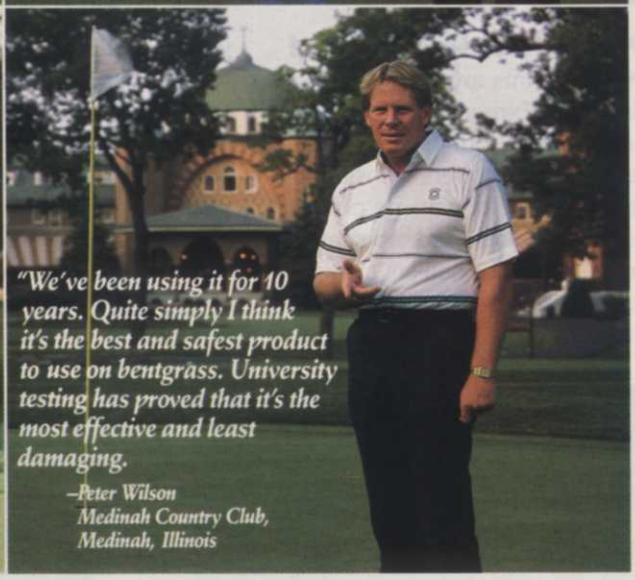

"I feel comfortable using it on my tees and greens, because it doesn't damage the bent-grass. I just wouldn't feel as comfortable with anything else."
–Peter Smith
Shinnecock Hills Golf Club
Southampton, NY


"We've been using it 18 years. We get good control, with no safety problems. And it spreads well, so we don't miss spots."
–Bob Randquist
Southern Hills Country Club
Tulsa, Oklahoma


"We've had excellent results with it for about 20 years. It gives us surefire crabgrass control and it's entirely safe. We've had no problems with it, period."
–Bud Best
Oak Tree Golf Club,
Edmond, Oklahoma


"We've been using it for 10 years. Quite simply I think it's the best and safest product to use on bentgrass. University testing has proved that it's the most effective and least damaging.
–Peter Wilson
Medinah Country Club,
Medinah, Illinois

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Circle No. 135 on Reader Inquiry Card

neered with special low-speed gearing and a tight turning radius combined with sturdiness and ease of operation.

According to Yamaha, the Pro-Hauler chassis is longer and wider than the conventional all-terrain vehicle chassis. A 59.1" wheel base supports a heavy cargo load while a lockable differential keeps the turning radius at a snug 8.4' and reduces turf damage.

Electric start, automatic clutch, reverse gear and an 800 lb. capacity hitch are standard.

Circle No. 209 on Reader Inquiry Card

AMT fleet addition loaded with features and options

The AMT 622 is the newest addition to the John Deere fleet of five-wheel utility vehicles.

The 10 hp transport features a steering wheel, foot accelerator and brake pedal instead of handlebar controls. Dual headlights are standard. Options include tail and brake lights, turn indicators, horn, hour-meter and electro-hydraulic dump.

Four-wheel drive with differential lock provides extra traction in wet ground, and high-floatation tires minimize ground compaction. Variable speed transmission requires little operator training.

Circle No. 210 on Reader Inquiry Card

Kawasaki's Mule 1000 first of micro trucks

The Kawasaki Mule 1000 is described as a "true hybrid" in the utility vehicle market. The vehicle hauls quarter-ton loads in the bed and two

people up front. It goes anywhere thanks to a low center of gravity, independent suspension and off road tires.

The Mule is powered by a 454cc, four stroke, liquid-cooled Kawasaki engine. A dual-mode differential is optional. With a flip of a lever, the operator can lock the differential so both rear wheels turn together for maximum traction. Unlocked, the wheels provide a tighter turning radius and minimal soil disturbance.

Circle No. 211 on Reader Inquiry Card

Rack-and-pinion steering a new Utilitruck feature

The Columbia ParCar Utilitruck now features speed balanced rack-and-pinion steering manufactured by Columbia.

The gasoline model is powered by a 250 cc, 2-cycle, single cylinder air-cooled engine and a dry, fully automatic, variable speed overdrive transmission. The electric model features a

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Hydrogel helps water remain in soil

Viterra Gelscape is a granular, organic, super-absorbent hydrogel designed to increase the water-holding capacity, drainage and aeration of soils. When properly applied, Viterra has proven capacity to re-absorb many times without losing its strength, says Aglukon, which manufactures the product.

Gelscape is perfect for hydroseeding, according to Aglukon sales manager Bill Stinson. It can be applied in combination with fertilizer, mulch and seed at rates of 4 to 24 lbs. per acre. It can also be used in tree and shrub planting to promote healthier plant roots.

Gelscape granules have the ability to absorb more than 200 times their weight in water. The water is then gradually released to the soil and plants, reducing the possibility of plant damage due to moisture stress.

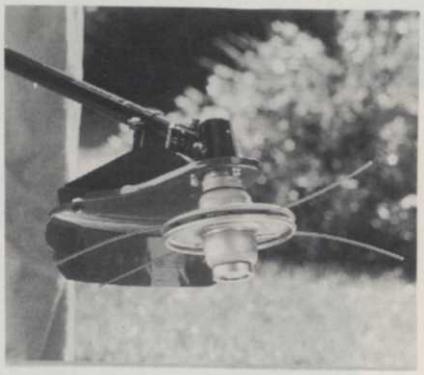
Circle No. 213 on Reader Inquiry Card

Count the features on new cutting head by Snapper

New from Snapper Power Equipment is the Fixed Line Cutting Head, with easy feeding and threading. The glide ball has replaceable wear pads to prevent scalping by allowing the head to glide along the ground above the grass.

A bundle of 50 pre-cut 16-inch lengths of .105 diameter line is standard.

Additional packages of .095, .105 and .130 diameter lines are available in a convenient carrier that attaches to the operator's belt or the machine. The tool features easy fedding of the monofilament lines without loosening bolts of tricky threading through alternating holes. This allows quick line changing by the operator.



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Hand-held blower and vacuum new to line

Shindaiwa, Inc. has added a hand-held blower and blower/vacuum combination to its line of outdoor power equipment.

The HB-28 blower features a 28cc,

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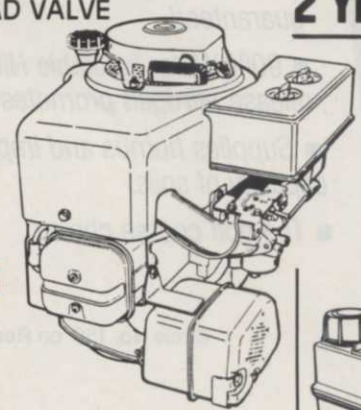

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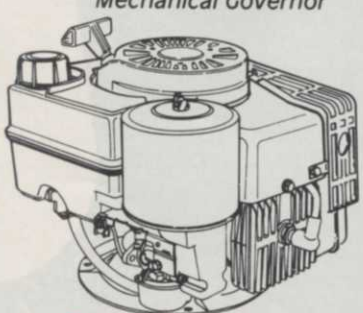

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We don't just claim to have the most durable carriers on the market, we guarantee it with the industry's only extended 3-year warranty: the Gold Star Protection Plan.

We also offer Jerr-Dan REDLINE Parts Service, a replacement parts service that guarantees your parts are shipped within 48 hours of your call, or they're free**. And Jerr-Dan provides exclusive single source leasing to give you highly competitive rates that eliminate the hassles of dealing with third-party financial institutions or leasing companies. So call 1-800-248-6000 or 1-800-842-4000 in Pennsylvania now for a free demonstration and get your business moving today.

*The payload carrying capacity of any truck is determined by the G.V.W.R. of the cab chassis, the curb weight of the cab chassis and the weight of the body. It is important that you determine that your truck has satisfactory carrying capacity and axle ratings for specific applications. Jerr-Dan's authorized sales representatives are available to assist you in this regard.

**Free parts offer is on current models only. While we attempt to maintain an inventory for all models back seven years, some units no longer in current production require fabrication prior to shipment and therefore do not qualify. Contact your parts representative for assistance.

HEADQUARTERS 1-800-248-6000, PA only 1-800-842-4000. Other offices located in St. Louis, MO., Chicago, IL., Atlanta, GA., Cincinnati, OH., Los Angeles, CA., Dallas, TX., In Canada, H.R. Runciman & Co., Ltd.

JERR-DAN® Industrial

...BUILT FOR THE LONG HAUL.

Circle No. 139 on Reader Inquiry Card

two-cycle engine that delivers air flow velocity of 150 mph at 350 feet per minute.

The HB-28 weighs 11 pounds, and comes with an anti-vibration handle.

The HB-28V allows the blower to be converted to a vacuum featuring a heavy duty two bushel bag.

Circle No. 215 on Reader Inquiry Card

Spotseeder attachment makes reseeding easy

Ryan's Ren-O-Thin Spotseeder simplifies reseeding of bare spots, damaged turf and smaller yards.

The seeder mounts on the front of the Ren-O-Thin, and the Spotseeder drive wheel engages the front wheel and activates the seeder.

The Spotseeder hopper holds up to 25 pounds of bluegrass seed, depending on seed density. An adjustable metering gate works well with any type of grass seed. Seed openings are spaced every ½ inch, on centers, to assure good seed coverage.

The Ren-O-Thin Spotseeder ia available ready-mounted as a factory model, or as an attachment for existing Ren-O-Thin III and Ren-O-Thin IV models.

Circle No. 216 on Reader Inquiry Card

CoRoN®

The Leading Force In Controlled Release Nitrogen

CoRoN 28-0-0, slow release clear liquid fertilizer is your leading source of nitrogen for all your lawn and turf feeding needs.

CoRoN is a concentrated clear liquid controlled release nitrogen fertilizer that promotes even turf growth over an extended period with a very low potential for burn.

CoRoN liquid fertilizer's compatibility with turf protection products, its long term storage stability, and flexible mixing capacity makes CoRoN the leading Controlled Release Nitrogen for all your growing needs.

The Leading Force In Controlled Release Nitrogen For:
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Golf Courses • Sports And Recreational Facilities • Nurseries

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P.O. Box 198 • Souderton, PA 18964 • Phone: (800) 338-0836 • (215) 723-5099 • FAX (215) 721-2800

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Circle No. 114 on Reader Inquiry Card

Controlled release fertilizer is here

Remke Enterprises, Inc. has introduced a complete line of controlled release granular fertilizers for container growers, greenhouse crops, landscape plantings and field liner installation.

Called Gromax, the fertilizers are available in six-eight month and three-four month release formulations with six different stock blends to choose from.

All blends are available with or without a slow release micronutrient package.

Custom blending is also available.

Circle No. 217 on Reader Inquiry Card

Barricade chosen as the name for new weed control

Sandoz Crop Protection announced Barricade as the trade name for prodiamine, a new herbicide for turf and ornamentals.

Barricade provides long residual control of grasses and broadleaf weeds and is expected to be registered for turf uses in 1990, says Mark Busch, Sandoz's marketing manager.

Field trials have shown the product to be effective on crabgrass, goosegrass, *poa annua*, prostrate surge, chickweed and other broadleaves, with residual control ranging from 10 to 12 months, according to the manufacturer.

circle No. 218 on Reader Inquiry Card

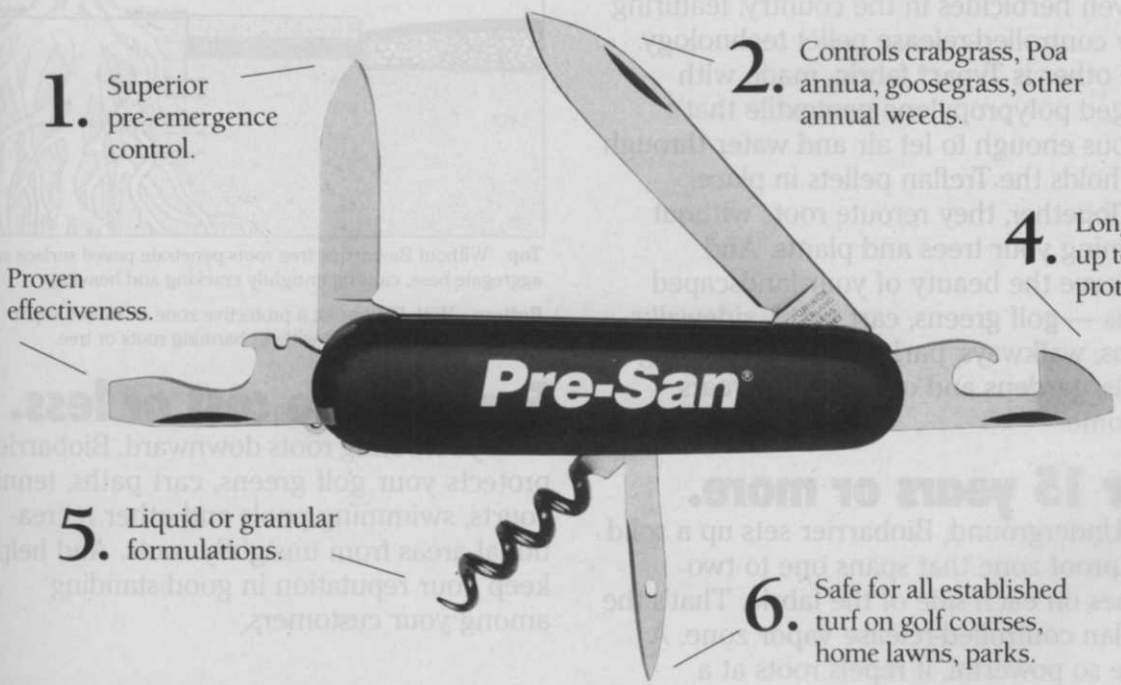
Seven Great Reasons To Use Pre-San® For Weed Control:

1. Superior pre-emergence control.

2. Controls crabgrass, Poa annua, goosegrass, other annual weeds.

3. Proven effectiveness.

4. Long-lasting—up to four months protection.



5. Liquid or granular formulations.

6. Safe for all established turf on golf courses, home lawns, parks.

7. **FREE!** Get an authentic Swiss Army knife when you purchase a minimum of $250 of PRE-SAN pre-emergence herbicide products. Send your name, address, and a distributor invoice (copy ok) to Sierra, 12101 Woodcrest Executive Drive, #190, St. Louis, MO 63141. Offer only good while supplies last, so order PRE-SAN now for superior weed control and pocket your free PRE-SAN Swiss Army knife.

Pre-San
SIERRA

© 1988 Sierra Crop Protection Company. PRE-SAN is a registered trademark of Sierra Crop Protection Company. Always read and follow label directions carefully. This product contains BETASAN* herbicide. BETASAN is a registered trademark of ICI Americas Inc.

Circle No. 180 on Reader Inquiry Card

Reroute roots and
the ugly side of yo

Introducing Typar® Biobarrier™ root control system.

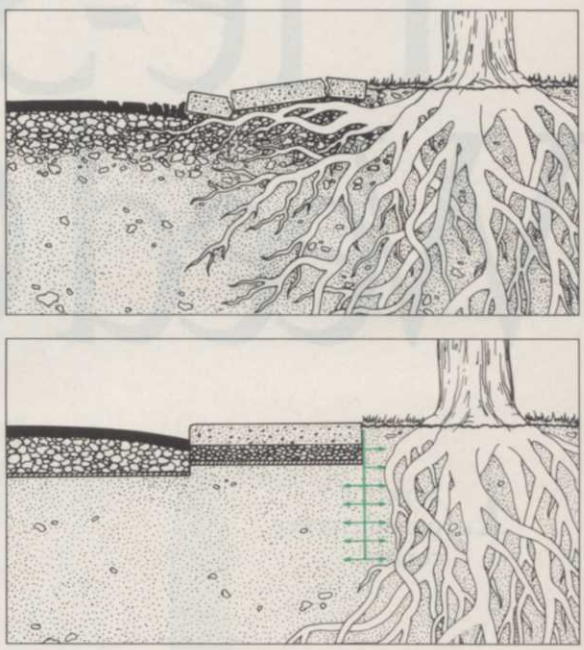
Give unsightly roots a new direction in life. Down. With new Biobarrier, the advanced root control system that sends your maintenance costs in the same direction.

Biobarrier combines two of the most effective, longest-lasting elements in root control. One is Treflan®, one of the most proven herbicides in the country, featuring new controlled-release pellet technology. The other is Typar® fabric, made with rugged polypropylene geotextile that's porous enough to let air and water through but holds the Treflan pellets in place.

Together, they reroute roots without harming your trees and plants. And preserve the beauty of your landscaped areas — golf greens, cart paths, sidewalks, curbs, walkways, parking lots, swimming pools, gardens and others — for years to come.

For 15 years or more.

Underground, Biobarrier sets up a solid rootproof zone that spans one to two inches on each side of the fabric. That's the Treflan controlled-release vapor zone. A zone so powerful, it repels roots at a controlled rate for 15 years or longer.



Top Without Biobarrier, tree roots penetrate paved surface and aggregate base, causing unsightly cracking and heaving.

Bottom With Biobarrier, a protective zone of Treflan vapor reroutes roots downward without harming roots or tree.

For half the cost or less.

By rerouting roots downward, Biobarrier protects your golf greens, cart paths, tennis courts, swimming pools and other recreational areas from unsightly roots. And helps keep your reputation in good standing among your customers.

ame
r landscape.

The cost savings are just as dramatic. Over 50%, in fact, during Biobarrier's lifespan.

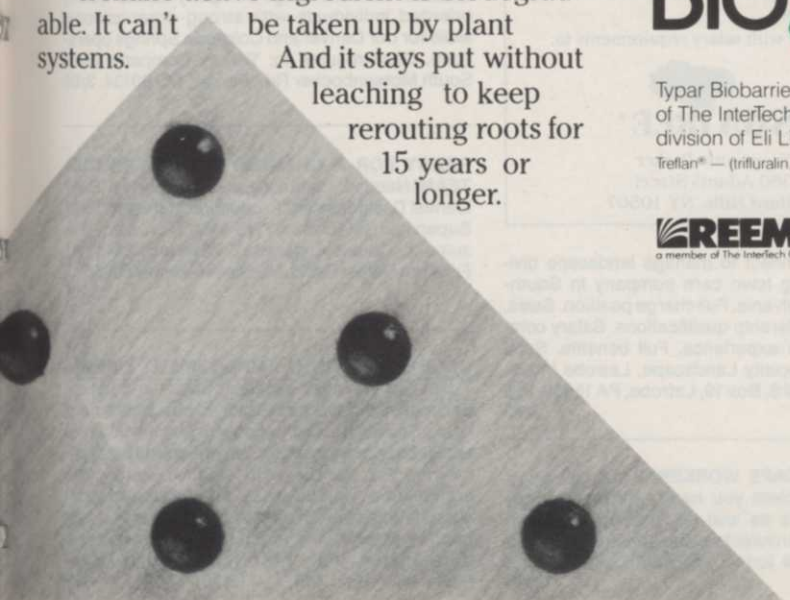
Without Biobarrier, you're spending plenty to trench, trim roots and replace damaged landscaping. And it has to be redone often to protect greens, cart paths and other landscaping.

But with Biobarrier, you'll only do the job once every 15 years — trim roots, replace damaged cart paths and install Biobarrier.

Easy on plants and landscaping.

Unlike other root control methods, Biobarrier won't harm trees or nearby landscaping. It doesn't kill roots, it just reroutes them away from your golf, recreational or landscaped areas.

Treflan's active ingredient is biodegradable. It can't be taken up by plant systems. And it stays put without leaching to keep rerouting roots for 15 years or longer.



Easy to install.

The Typar fabric in Biobarrier is flexible to make installation simple. Just install vertically along your golf, recreational or landscaped areas where tree roots threaten to bring out the ugly side of your landscape.

Call toll-free.

For the complete story on Biobarrier, see your Elanco representative. Or send for a free technical brochure from Elanco Products Company, Lilly Corporate Center, Dept. EM-455, Indianapolis, IN 46285, U.S.A. Or call toll-free: **1-800-352-6776.**

TYPAR® Biobarrier™ Root Control System

Typar Biobarrier is jointly marketed by Reemay, Inc., a member of The InterTech Group, Inc., and Elanco Products Company, a division of Eli Lilly and Company.

Treflan® — (trifluralin, Elanco)

REEMAY a member of The InterTech Group, Inc.

ELANCO

Circle No. 119 on Reader Inquiry Card

CLASSIFIEDS

RATES: $1.20 per word (minimum charge, $35). Bold face words or words in all capital letters charged at $1.45 per word. Boxed or display ads: $100 per column inch-1x (one inch minimum); $95-3x; $90-6x; $85-9x; $80-12x. (Frequencies based on a calendar year). Agency commissions will be given only when camera-ready art is provided by agency. For ads using blind box number, add $15 to total cost of ad. Send ad copy with payment to Dawn Nilsen, LANDSCAPE MANAGEMENT, 1 East First Street, Duluth, MN 55802 or call 218-723-9505. Fax Number 218-723-9615.

BOX NUMBER REPLIES: Mail box number replies to: LANDSCAPE MANAGEMENT, Classified Ad Department, 1 East First St., Duluth, MN 55802. Please include box number in address.

BUSINESS OPPORTUNITIES

GENERAL MANAGER NEEDED FOR ESTABLISHED LANDSCAPE CONSTRUCTION FIRM IN SAN JOSE/ PLEASANTON AREA. MINIMUM 10 YEARS EXPERIENCE IN SALES, ESTIMATING AND OPERATIONS. SEND COMPLETE RESUME TO:
PACIFIC STATES LANDSCAPING, INC.
P.O. BOX 1569
EL TORO, CA. 92630

BETTER THAN A FRANCHISE: Guaranteed income, no franchise fees, established lawn maintenance packages, year round "work". Will train and finance aggressive individuals with down payment. **PALM BEACH FLORIDA,** (407)627-8141. 3/89

WANTED TO BUY OR SELL a golf course? Exclusively golf course transactions and appraisals. Ask for our catalog. McKay Golf and Country Club Properties, 15485 N. East Street, Lansing, Michigan 48906. Phone (517)484-7726. TF

HELP WANTED

LANDSCAPE PROFESSIONALS!

Nationally-ranked landscape contracting firm **SCAPES, INC.** is seeking to hire highly-trained professionals into the position of **PROJECT MANAGER.** We have openings in our Atlanta and Washington, DC offices. Higher pay and bonuses for qualified person. Please contact **SCAPES, INC.** at (404) 956-7500 for interviews. Also hiring **EXPERIENCED LANDSCAPERS.**

ADVANCE YOUR CAREER Large and rapidly growing midwest landscape contracting and maintenance firm seeks quality, energetic **MAINTENANCE SUPERINTENDENT.** Must be able to schedule, train and motivate crews; skills would include degree (or years of experience), chemical applicator's license (or the ability to obtain license), turf and horticulture knowledge, communication skills, blueprint reading, job measurement, directing maintenance crews, and maintenance estimating. Wages and benefits commensurate with ability and experience. Send Resume to: **TORRE & BRUGLIO LANDSCAPING INC.,** 20401 Hall Road, Mt. Clemens, MI 48044. 3/89

Grounds Maintenance Supervisor/Foreman needed. Established landscape company seeking quality-oriented individuals who are not afraid of aggressive teamwork. Two years field experience minimum. Competitive salary, benefits and bonus. Send resume to GreenScape, Inc., 5548 Summer Avenue, Memphis, TN 38134. 4/89

GROW WITH TURF: Career opportunities are available for professionals with experience in lawn care, landscaping and irrigation. We're looking for aggressive self-starters to join our organization. Thrive on the challenge of our growth. Enjoy above average earnings and excellent benefits. Send resume and salary requirements to Turf, P.O. Box 433, Moorestown, NJ 08057 or call 1-800-678-TURF. 3/89

Experienced Foreman. Landscaping Design & Construction firm seeking an experienced Foreman 3-5 years. Individual must be able to take total responsibility of products from start to finish. Plant knowledge, construction techniques and blueprint reading a must. Send resumes to: Vander Veen Landscape Company, P.O. Box 164, Mason, MI 48854. 517-676-1093. 4/89

ARE YOU A NATURAL?

Then bring your talents to us. We're **SAV-A-TREE,** one of the fastest growing arboricultural service companies in the industry, specializing in natural holistic tree and shrub care.

We are dedicated to excellence and are seeking ambitious, detail oriented individuals to join our expanding team.

VP SALES

As a member of our management team responsibilities include major account management, sales forecasting and budgeting, marketing, recruitment, and training. Candidates should have an undergraduate degree or equivalent and an in-depth knowledge of arboriculture.

SALES REPRESENTATIVE

Responsible for developing and servicing a customer base in an assigned territory. Ideal candidate will have a college degree in horticulture or a related field and a strong desire to succeed. Previous sales experience is a plus.

These positions offer outstanding compensation.

Send resume with salary requirements to:

SAVA TREE

Stephanie Parker
360 Adams Street
Bedford Hills, NY 10507

Landscape architect to manage landscape division of growing lawn care company in Southwestern Pennsylvania. Full charge position. Sales, design and leadership qualifications. Salary commensurate with experience. Full benefits. Send resume to: Specialty Landscape, Latrobe Industrial Park, R.D. #6, Box 19, Latrobe, PA 15650. PH. (412)539-2322. 3/89

NEED LANDSCAPE WORKERS? We can solve any labor problem you have. We have documented workers as well as foremen, leadmen, irrigators and architects available at a price you can afford. Call today! **AMIGOS** Dallas, Texas **214-634-0500.** 4/89

LANDSCAPE MAINTENANCE SUPERVISORS Rapidly expanding landscape management firm seeking experienced, quality individuals to be field/working supervisors. Tremendous opportunity to grow. Full benefits. Contact: Tandem Landscape Company, 33W480 Fabyan Parkway, West Chicago, Illinois 60185, Attn: Glenn Kedzie. TF

Lawn Care $20M-$50M

Career opportunities coast-to-coast. Employer retained. Experts in personnel since 1968.

USA Careers 515-394-2556
New Hampton, IA 50659

Couple - gardener/handyman, 40 hour week, Housekeeper/Cook - 20 hour week, 5 acres, orchard, vegetables, lawns, glasshouse. Good salary, 4 room house. References and resume required. Bontecou Farm, 610 Route 32 North, New Paltz, NY 12561. (914)255-1740. After 6 P.M. 4/89

OPERATIONS DIRECTOR- Quality-conscious company seeks reliable, responsible manager to plan, execute, supervise and assure quality control of its grounds operations. Minimum qualifications: bachelor's degree in horticulture or related field; four/five years' experience supervising grounds maintenance; and a thorough knowledge of golf course maintenance, ornamental horticulture, plant diseases, insect pests, pesticides, herbicides, and other turf chemicals. Salary negotiable. EOD date 3/89. Send resume/references to Boyd Enterprises, 16632 Oakmont Avenue, Gaithersburg, MD 20877. 3/89

Commercial landscaping firm needs highly motivated foreman to take over newly created irrigation division. Excellent opportunity for responsible individual to develop divisions potential in the high demand Baltimore-Washington area. Call Steve at (301)850-6907 for more information. 3/89

Grounds Maintenance--Supervisor/Foreman: Established front range company seeks quality oriented individuals with strong organizational skills for our Denver and Colorado Springs operations. Send resume to: Yerkey Company, 8996 South Motsenbocker Rd., Parker, CO 80134. 3/89

READY FOR A CHANGE? COME JOIN OUR TEAM! Needed: "well seasoned" personnel *Residential Design/Sales *Production Manager *Field Supervisor *Mechanic/Yard Man *Foreman. Resume to: Dennis Anderson & Wife, Inc., 28433 N. Fremont Center Road, Mundelein, Illinois 60060. 3/89

CLEVELAND OHIO EMPLOYMENT OPPORTUNITIES We offer excellent salary and benefit package and opportunities for advancement in our design/build firm. Our expansion plans include establishing a branch office. We are accepting applications for people with skills in landscape architecture, design-sales, supervision of landscape installation, maintenance, tree crews and nursery. Please send your resume or give us a call. Yardmaster, Inc., 1447 North Ridge Road, Painesville, Ohio 44077. (216)357-8400. 4/89

Hahn

Powerful. Quiet. Precise.
Twin Cylinder Powered
MULTI-PRO 418

The Hahn Multi-Pro 418 has all the features needed to enhance and maintain quality turf.

This heavy duty vehicle sprays, fertilizes, top dresses, seeds, and hauls. The high flotation tires and four wheel design protect turf and reduce compaction, making it gentle enough to be used on delicate greens.

With a low center of gravity and wide stance, the Multi-Pro 418 hugs hillsides even under the heaviest loads. An abundance of power is provided by an 18HP Twin Cylinder Kohler engine with whisper quiet exhaust.

From a Precision Liquid Application System to an Accurate Pendulum Action Dry Applicator to a Rugged Cargo Transport Vehicle, this Multi-Pro 418 is built specifically for your turf maintenance demands. Versatility, Dependability, and Performance. The Multi-Pro 418 from Hahn, the Leaders In Application Equipment.

Hahn

TURF PRODUCTS DIVISION
1625 N. Garvin Street, Evansville, Indiana 47711-4596
Call Toll Free (800) 457-HAHN
In Indiana (812) 428-2020 Telex: 27-8429
FAX (812) 428-2049

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PRO-CONTROL
Calibrates and maintains an even rate on every acre to be sprayed regardless of vehicle speed or terrain.

FOAM MARKER
Helps eliminate overlap and skips of spray material. Directional valve controls flow of foam to either boom.

SPREADER
The pendulum action spreader with its conical steel hopper ensures accurate flow of all materials... fertilizer, seed, lime...even damp sand.

UTILITY
When transporting materials, the cargo bed with optional hydraulic dump will provide another valuable attachment.

HELP WANTED

New landscaping co. seeks landscaping mgr. with experience in estimates, tye wall and field supervision. Send resume to Pines, 674 N. Meridian, Valparaiso, IN 46383, Attn: Ron Turner. 3/89

We are recruiting!

We're looking for knowledgeable people in the following areas:

Environmental Care, Inc.
landscape management

Arbor Care
commercial & industrial arboriculture

Interiorscape Division
interior landscape maintenance

Positions available in:

Arizona
- Phoenix

California
- East Bay
- Inland Empire
- Los Angeles
- Palm Springs
- Sacramento
- Santa Ana
- San Diego
- San Jose
- Ventura

Colorado
- Colorado Springs
- Denver

Florida
- Jacksonville
- Miami
- Orlando
- Tampa/ St. Petersburg

Nevada
- Las Vegas

Texas
- Houston

Send resume to:
Robert L. Scofield
Personnel Department
24121 Ventura Boulevard
Calabasas, CA 91302

an equal opportunity employer by choice

LANDSCAPE DESIGN/SALES: If you're a designer, read this notice in addition to the ad above. **Landscape Techniques, Inc.** is offering a unique opportunity for a talented individual with at least an under grad degree, who is confident to apply his/her skills, and understands that a 'Catch-22' of strong sales and an excellent reputation is critical to our success. Send resume to: Landscape Techniques, Inc., PO Box 616, Nutley, N.J. 07110 or call (201)667-8050. You, too, won't be disappointed. 3/89

LANDSCAPE DESIGNER - SALESPERSON this established landscape design/build firm is presently seeking applicants for this challenging position. BS in Horticulture or related field required. Excellent growth potential for career oriented persons. Send resume to: David J. Murphy Landscape Inc., 670 Boston Post Road, Marlboro, MA 01752. 508-485-2030. 3/89

LANDSCAPE EMPLOYMENT OPPORTUNITIES - One of the Midwest's largest commercial landscape contracting and maintenance firms seeks motivated, quality individuals to fill the following positions: Landscape Construction Superintendent, Estimator/Contract Administrator, Landscape Materials Buyer, Foremen, Pesticide Applicators. Excellent salary and benefit package. Send resume to: Reinhold Landscape, Inc., 23216 Telegraph, Flat Rock, MI 48134. 3/89

AREA MANAGER: Large East Coast commercial landscape and maintenance contractor needs well qualified Area Manager. Landscape-related degree preferred with 5 yrs. experience a must. Supervisory experience required. This is your opportunity to join an innovative and growing team. Send resume or call Ruppert Landscape Co., Inc., 17701 New Hampshire Ave., Ashton, MD 20861, Attn: Mr. Otero (301)774-0400. 3/89

LANDSCAPE MAINTENANCE FOREMAN: Located South of Boston fast-growing organization is seeking an experienced individual to assume full responsibility for our condominium property division. You must be a self-starter with proven supervisory experience, good communication skills, mechanical abilities and possess a sincere desire to maintain a high degree of professionalism. Our clients are willing to pay for the best- so are we! Your compensation package for this year-round position will be commensurate with your abilities. Please send resume, with salary history, in strict confidence to: South Shore Landscape Ser. Inc., 2033 Ocean Street, Marshfield, MA 02050. 4/89

The Central Park Conservancy is a private non-profit organization dedicated to the restoration and preservation of New York's premier park, Central Park. We are seeking someone to fill the challenging position of Turf Care Coordinator for the Central Park Conservancy. Responsibilities will include management of high intensity use areas such as the Sheep Meadow, Bowling Greens, 26 Ballfields; over 500 acres of turf in all. A working knowledge of irrigation systems, installation and maintenance of lawns, familiarity with wide variety of power equipment. Daily management of field personnel, accurate record keeping required. Supervisory experience a must.

If you are a responsible, hard working quality oriented individual who meets these requirements, send resume with salary history to: Neil Calvanese, Director of Horticulture, Central Park Conservancy, 830 Fifth Avenue, New York, N.Y. 10021.

EOE

HORTICULTURIST: Indianwood Golf And Country Club is now accepting applications for a HORTICULTURIST. Responsibilities include: Flowers on golf course grounds, clubhouse, a three acre estate, and greenhouse duties. Must have 2 years of education in Horticulture, and a minimum of 2 years experience. Salary is negotiable. Please send resume to: Mark Jackson, Indianwood Golf and Country Club, 1081 Indianwood Rd., P.O. Box 5, Lake Orion, MI 48035. 3/89

SUPERVISORS: (project foremen) to join a nationally acclaimed firm looking to expand into its second generation. The Long Island area supports a high budget landscape industry. Year round employment, company benefits and continuing education available. Experienced and aggressive people send resume to: Goldberg & Rodler, Inc., 216 East Main Street, Huntington, New York 11743. 4/89

MAINTENANCE DIVISION GENERAL MANAGER

Full Service Landscape Company with Design, Contracting, Maintenance and Nursery Divisions offers a career opportunity for a top notch manager.

Maintenance Division is currently grossing 2 million in annual sales with 50+ employees. Proven experience and results managing an organization of this size or larger a requirement.

Vibrant growing market area and strong company financial position make this a rare opportunity for growth if you are one of the Country's Best Landscape Maintenance Managers.

Send resume and Salary History to:

1174 Florida Central Pkwy
Longwood, Florida 32750

PROJECT SUPERVISORS- Established company has opening for motivated, responsible supervisors to direct grounds care/golf course maintenance projects. Must have 3-4 years supervisory and working experience in areas indicated. Salary negotiable, depending on qualifications and experience. Send resume to: Boyd Enterprises, 16632 Oakmont Avenue, Gaithersburg, MD 20877. 3/89

LANDSCAPE INSTALLATION/CONSTRUCTION MANAGER: Chicago area landscape maintenance company needs working ("hands on") manager to head up landscape installation division. This is a year-round position with benefit package and career path. Send resume and salary requirements to Panoramic, 54 N. Eisenhower Lane, Lombard, IL 60148. (312)620-5130. 3/89

CAREER OPPORTUNITIES

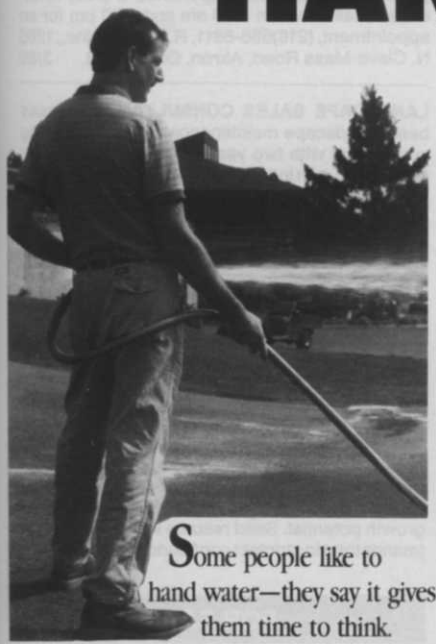
KT ENTERPRISES INC., a Commercial Landscape Management Firm servicing the Washington, D.C. Metropolitan market, is accepting applications for employment. All positions offer excellent salary, health benefits, a retirement plan and most important, an opportunity to work in a quality organization that will continue to offer growth and professional satisfaction. Please send a resume to, and/or call our Personnel Director, Caroline Fennimore if you are interested in any of the following positions:

- Supervisory-Applications, Maintenance, Pruning, Floral
- Sales-New Sales, Service Representatives
- Landscape Senior Estimator-Familiar with large commercial landscape projects.

KT Enterprises Inc.
"The Landscape Management Professionals"
7950-1 Woodruff Court, Springfield, VA 22141
(703) 764-1870

MANAGER OF MAINTENANCE OPERATIONS. Specializing in large scale corporate and commercial projects in the Chicago Metro Area. Position involves all client communications, pricing, invoicing, jobsite inspections, hiring and training personnel, purchasing and scheduling of equipment, materials and subcontractors. A solid background in turf and ornamental management is required. Send resume and salary requirements to: Otto Damgaard Sons, Inc., P.O. Box 182, Des Plaines, IL 60016. 3/89

DOES YOUR TURF PLAY HARD TO WET?



Some people like to hand water—they say it gives them time to think.

For most it's a necessary evil that takes valuable time away from more important things. Using AQUAGRO® soil wetting agents regularly will reduce hand watering, which will either cut into your daydreaming time, or free you and your crew to do other things...it depends on your perspective. *And that's not all AQUAGRO does for you.*

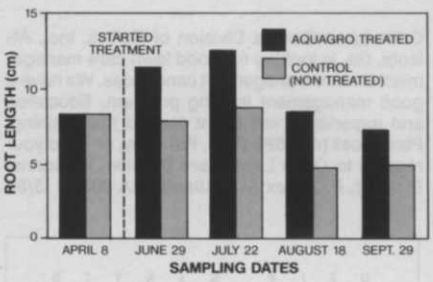
The Difference is Quality Turf

AQUAGRO helps you maintain peak turf quality all season long, while cutting irrigation time and costs. It's a fact that AQUAGRO makes the most efficient use of available water by allowing it to penetrate deep and uniformly into the rootzone, before it has a chance to run off or evaporate. AQUAGRO alleviates localized dry spots and quickly drains puddles. It moves water through both thatch and compacted soils. And it keeps berms and slopes from drying unevenly.

Getting More Water to the Root of the Problem

AQUAGRO doesn't work miracles, but used as part of a complete turf management program, AQUAGRO can solve water related problems and promote deep root growth. This means good playing surfaces that stand up better against traffic and stressful summers.

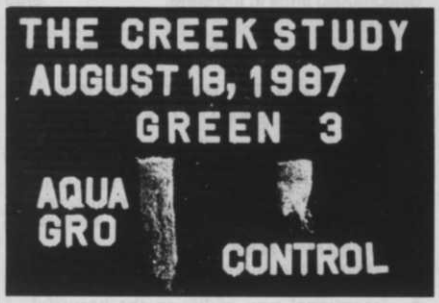
In trials on bentgrass greens treated with AQUAGRO, the recommended program helped maintain significantly deeper roots and better looking turf than the control, all summer long.



In addition to making more moisture available to roots, AQUAGRO improves the distribution and efficacy of water soluble fertilizers and pesticides. It helps move them through heavy thatch.

University research shows AQUAGRO can reduce the severity of fungus diseases by eliminating surface moisture conditions that promote fungal growth.

The photo shown here is part of a research field trial where AQUAGRO reduced water related problems caused by soil layering conditions. AQUAGRO allowed deep root penetration by promoting water movement through the layers.



Demand the Proven Leader

For more than 30 years AQUAGRO has been the standard to which all other wetting agents have been compared. AQUAGRO is a 100 percent active ingredient blend of non-ionic surfactants. It works in all soil types...for up to four months. Available in Liquid or Spreadable formulations. And AQUAGRO is organic and non-toxic to plants and animals.

If you've got better things to do than spend your time hand watering and daydreaming, and need to get the most from available water, give your AQUAGRO distributor a call. If you don't know who they are, give us a call.

1-800-257-7797, in N.J. (609) 665-1130

AQUATROLS

The Water Management People

1432 Union Avenue, Pennsauken, NJ 08110 FAX: (609) 665-0875

HELP WANTED

GOLF COURSE SUPERINTENDENTS AND ASSISTANTS: Innisbrook, Florida's premier golf resort is currently accepting resumes for superintendents, managers and supervisors. We have 63 holes of Florida's finest golf. Excellent benefit program including bonus and clubhouse membership go with these positions. We offer opportunities for advancement to quality oriented individuals with a desire for career advancement. Join our team of professionals. Minimum requirements: degree in golf course management, agronomy or related field, plus 2-3 years experience. Send resume to: R.A. Schust, Personnel Dept., Innisbrook Resort, P.O. Box 1088, Tarpon Springs, FL 34688-1088. EOE. 4/89

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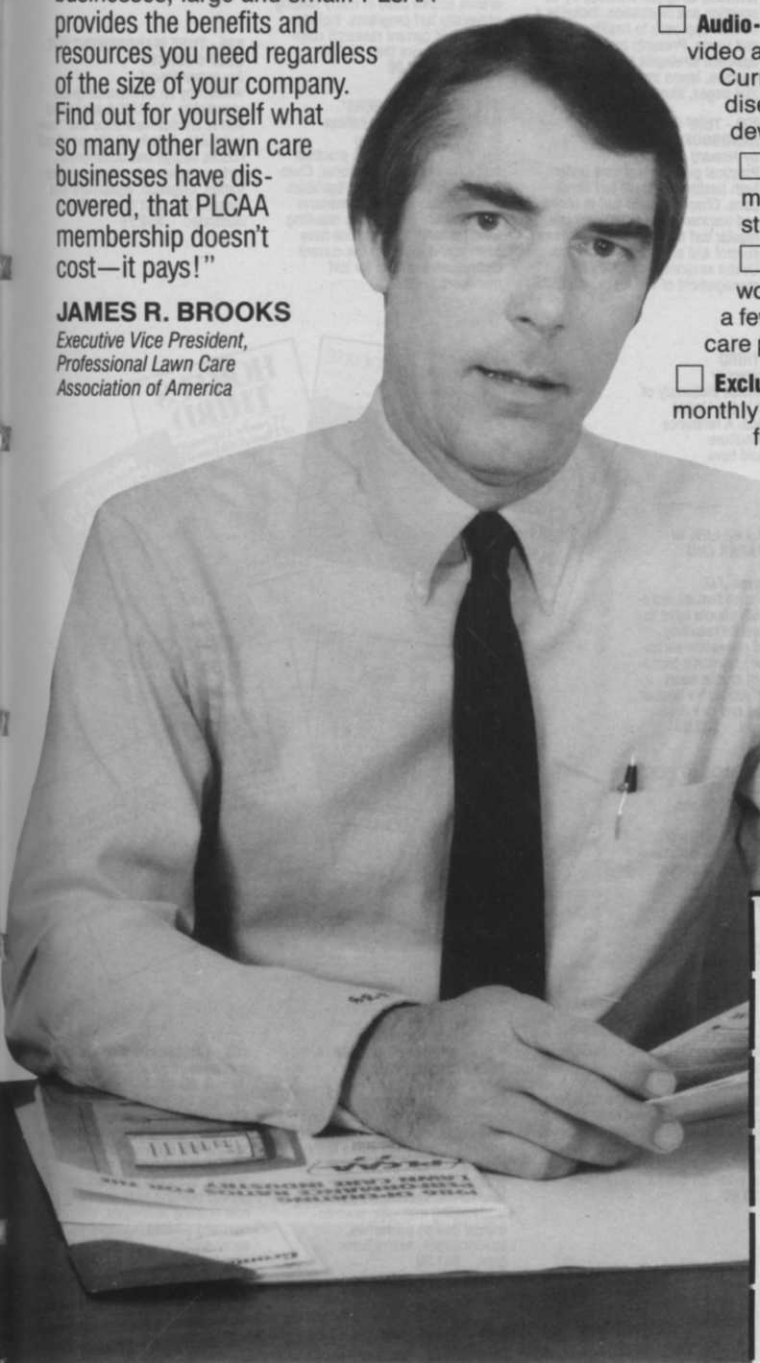

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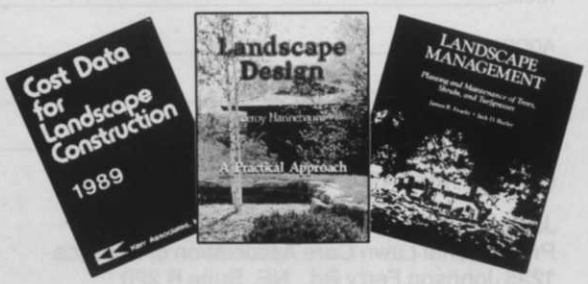

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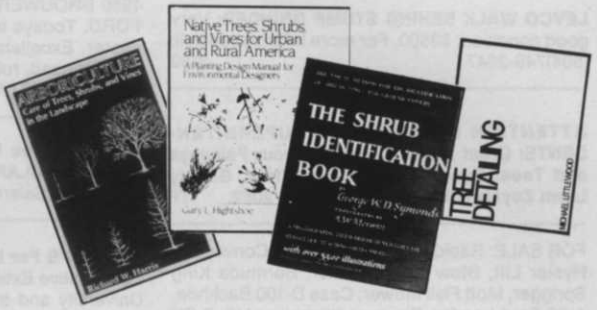
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PROBLEM MANAGEMENT

by **Balakrishna Rao,** Ph.D.

Straightening tipped trees

Problem: *How can wind-blown trees be straightened up? Gradual tipping of parking lot trees has occurred in our lot. Do you have any solution other than digging the trees? (Wisconsin)*

Solution: The gradual tipping that you describe is probably a result of a constant wind from one direction. The tipping caused by this wind could be due to either actual shifting of the root ball or bending of the tree trunk.

The root ball of a newly transplanted tree acts like a ball and socket joint. A force against the tree canopy, such as wind, causes the root ball to shift or rotate in its planting hole if there has been insufficient root establishment outside the root ball. Under extreme wind conditions, even mature trees with shallow root systems can be blown over.

Attempting to straighten a tree by pushing or pulling the trunk without digging around the root ball could cause the root ball to break apart. Extensive root damage will limit a tree's chances of survival.

Digging around the root ball and then straightening the tree is the only practical solution. The tree should also be properly staked or guyed for a year or two to brace the tree while establishing its root system. Thinning the crown will also reduce its wind resistance.

The tipping may actually be the result of a bending trunk instead of a shifting root ball. A trunk which does not taper, that is, increase in trunk diameter as height decreases, cannot support the canopy above it.

A tapered trunk will flex uniformly along its length when the tree is subjected to the force of wind. An untapered trunk will permanently bend or break because the stress against the trunk is not evenly distributed, but is concentrated at one location. A young tree with low branches will develop trunk taper better than will another tree of the same age and species that has had its lower branches removed. As a tree matures and develops adequate trunk taper, the lower branches can be shortened and eventually removed.

Improper staking or guying can also cause a tree trunk to bend or break. The point of attachment of the stake ties or the guy wires should be about 6 inches above the lowest position on the trunk that will support the crown. The trunk should be secured so that a slight amount of movement is possible. Attachment to the trunk that is too high or too rigid will transfer all the stress of wind resistance to that portion of the tree above the point of attachment. This may exceed the structural strength of the trunk at this location and either deform or break the trunk at or above the tie.

No way to remove heavy metals

Problem: *How can heavy metal (lead, cadmium, etc.) concentrations be dealt with in the landscape so as not to pose a hazard to plants and people? (California)*

Solution: Ideally, soil testing should be performed to determine the heavy metal concentrations in soils. Assuming that through proper soil testing, high levels of heavy metals have been established, I feel that there is nothing that can be done to reduce the already present high levels.

For the future, if you know the source of these, avoid further accumulations. Dr. Elton Smith, Professor of Ornamental Horticulture, Ohio State University, also agrees with the above comments and added that based on a study conducted in Ohio using composted municipal sludge containing heavy metals, he feels that the composted sludge should be safe to use around ornamental plants but not safe on edible crops such as vegetables, particularly root crops. We are not familiar with any published data or standards for heavy metal toxicity established for ornamental plant injury. However, we feel that standards for heavy metal toxicity to humans should be available from the EPA in California. Therefore, contact your local EPA office for further information.

Ridding fairways of *poa annua*

Problem: *Even though Prograss is safe to use on perennial ryegrass, would it be an advantage to kill off poa annua before overseeding bluegrass fairways with ryegrass? (Ohio)*

Solution: Your best approach would be to use a nonselective herbicide like Roundup to kill existing annual bluegrass and then to provide no-till renovation. With this approach you should be able to get rid of existing annual bluegrass plants prior to establishment of ryegrass.

Roundup will not have any soil residual, so if new plants emerge from seeds, consider using a selective herbicide like Prograss to manage future annual bluegrass, or use pre-emergent materials such as Dacthal, Betasan, or Pre-M to help prevent new annual bluegrass plants from emerging from seeds.

Remember that pre-emergent materials will not have any effect on plants already established. Unlike the use of pre-emergent herbicides for crabgrass control, applications to manage annual bluegrass should be made in late summer and spring.

If fairways contain desireable turfgrass, then it is better to use materials like Prograss instead of Roundup.

Reports indicate that many superintendents have given up trying to get rid of annual bluegrass in fairways and now use management practices to maintain annual bluegrass. Frequent watering and short mowing will favor annual bluegrass.

Read and follow label specifications for best results. Do not expect to eliminate annual bluegrass with herbicides alone. Provide good cultural practices such as watering, mowing and fertilizing, along with herbicides to manage annual bluegrass. **LM**

Balakrishna Rao is Manager of Technical Resources for the Davey Tree Co., Kent, Ohio.

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